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The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry
Founded in 1874

Original Articles

THE TONUS OF AUTONOMIC SEGMENTS AS CAUSES OF ABNORMAL BEHAVIOR¹

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The biological ascent of man from some species of the infra-human primate forces us, as neurologists, psychiatrists and behaviorists, to cultivate a purely biological conception of man if we hope to attain true insight into his psychophysiological processes and work out the most unprejudiced, most constructive methods of dealing with the forces that compose the individual.

In solving any ordinary problem in physical diagnosis it is of the utmost importance that the diagnostician shall work from a fair, unprejudiced theoretical basis in which he accepts that certain groups of typical physical signs or symptoms mean that certain pathological changes are occurring in certain unseeable, untouchable organs. To the unsophisticated lay mind, such methods of thinking, when they are accurate, are marvelous, even though the same process of reasoning is used daily in the work of the kitchen. In the early stages of modern medicine the physician who dared to percuss an abdominal mass and allow his diagnosis to be influenced by the signs he found upon percussion and palpation was regarded as an

¹ This subject was presented, upon invitation, before the New York Neurological Society. The theory, with data, is fully presented in "The Autonomic Functions and the Personality," monograph number 28 of the Nervous and Mental Disease Monograph Series.

unsafe heretic and a charlatan. He was condemned for indecency and his work suppressed by earnest physicians who represented the highest types of professional development of that lay; men who zealously believed that the safety of the patient and of society required the suppression of methods and technique which they were conditioned to feel were too intimate and indecent, and, perhaps, which they could not quite understand. It is obvious that such suppressive attitudes are serious resistances to the progress of any science, for no man can foresee what seemingly trivial things to-day may become of the utmost importance to-morrow, such as the discovery of the *germ* and the *repressed affect*.

In this paper I wish to show how the postural tensions of autonomic segments, stimulating the proprioceptors buried in their tissues, and the enteroceptors in the mucous membranes, give rise to afferent streams of feeling which constitute the affective cravings (popularly known as emotions or sentiments) and which, as our wishes, determine our thoughts and behavior. I would like to show how this probably occurs and how we may use the concept in our professional work. Such astute physiologists as Cannon and Carlson, after they had perfected the technique of studying the gastric motor functions that cause an intragastric itching or craving, that is, hunger for food, had to depend upon an *introspective study of themselves* in order to correlate the type of feeling or craving which was aroused by a certain type of gastric contraction. This emphasizes decisively that it is of the utmost importance for the physician to train himself to be able to introspectively study himself if he wishes to understand the influence of physiological processes upon the content of consciousness, *i. e.*, if he wishes to understand the influence of his own or the patient's cravings upon thoughts and behavior. The neurologist and physiologist can no longer afford to think accurately in neurological or physiological terms and loosely in psychological terms, neither can the psychiatrist or psychologist afford to think carelessly of the physiological processes that determine the content of consciousness. For many reasons it is hopeless to use such broad, loose, careless terms in discussion—as “mental” and “physical,” “mind” and “body,” “psychic quotients,” “psychic components,” “emotional state,” physiological changes during “emotion,” etc.

The ascent of man from a relatively simple organism (the embryonic cell) that is a complete automatic apparatus, which specializes into systems and gradually develops a striped muscle or projicient apparatus, naturally divides the matured organism into an

autonomic apparatus and its *projicient apparatus*.. The autonomic apparatus is constituted of the organs and their ganglionic nervous systems which regulate the *assimilation, conservation, transformation, distribution* and *use* of the energetic products which are necessary to sustain and promote life, and the *elimination* of the waste products. This necessarily includes the digestive, circulatory, respiratory and urinary systems, the sexual apparatus, the glands of external and internal secretion, and the autonomic chains of ganglia that lie outside of the brain and spinal cord and the autonomic ganglia that are imbedded in the spinal cord and brain stem. The growth of the embryo, as well as the origin and evolution of species from one-celled types shows that the autonomic apparatus gradually specialized into segments or divisions and subdivisions and developed a projicient apparatus around itself so that it might better adapt itself to and master the environment in order to acquire the gratification of its autonomic needs or cravings. The *projicient apparatus* is constituted of the skeletal and striped muscle systems, the exteroceptors, the intermuscular proprioceptors and their cerebrospinal nervous systems. On the whole, these divisions are essentially the so-called "voluntary" and "involuntary" sensorimotor systems; the old terms, "voluntary" and "involuntary," indicate that they were used to express their controllability by the so-called will or wishes of the *ego*. An autonomic segment may be crudely considered to be any organ composed of unstriped muscle cells with its blood vessels and ganglionic nervous system—such as the heart, stomach, small intestine, rectum, bladder, uterus, etc.

At birth we have a well-developed, harmoniously reciprocating autonomic apparatus and a poorly coördinated projicient apparatus, but the autonomic apparatus begins immediately to coördinate and exercise control over the projicient apparatus in order to master the environment. A most important factor begins to exert pressure upon the infant at birth and continues throughout its life. The pathological possibilities of this factor have been utterly neglected by the psychological and medical professions, until recently. It is the incessant, continuous *conditioning* pressure of the social herd upon the autonomic apparatus to conventionalize its methods of acquiring the gratification of its needs. I wish to lay the utmost emphasis upon this factor later in the paper.

Sherrington² has shown that all the striped muscles that help to maintain the skeleton erect are kept in a *continuous* state of postural

² Sherrington, C. J., Postural Activity of Muscle and Nerve, Brain, Vol. XXXVIII, Part III.

tonus by the proprioceptors, which are imbedded in the tendon sheaths, muscle walls, about the joints, etc., stimulating the efferent motor neurones in the cord. Thus, numerous *efferent-afferent-efferent-circuits* are constantly in more or less vigorous action and more or less associated together. In the same paper he has shown that the hollow viscera (stomach, bladder, heart, larger blood vessels) also are constantly, more or less, in a state of tonus, and he says the grip of the hollow viscera upon their contents is analogous to the grip of the hand upon an object. The muscle tonus of a limb may vary considerably without apparently interfering with its capacity for *lengthening* or *shortening*—that is, making overt movements. Sherrington says that the tonus of skeletal muscle is nothing more than postural contraction and is a coördinate reflex differing from ordinary reflexes in that its functions are posture and not movement. Langelaan³ and De Boer claim to have demonstrated that the postural tonus of striped muscle is controlled by what they call the “autonomic component,” that is, an accelerating or depressing influence from the autonomic nervous system. Sherrington’s researches indicate that postural tonus of the striped muscle is regulated by, primarily, the autonomic apparatus, if not directly so controlled. Langelaan claims that the striped muscle cell has a dual nature in that it is an unstriped cell having a striped apparatus imbedded within it and its tonus is under the control of the “autonomic component.” This mechanism is disputed by Van Rinjberk⁴ and Dusser de Barenne.⁵ The *exact nature* of the neurological mechanism has no direct bearing on the general concept of the personality. *It is sufficient to know that in a quick, continuous, intimate manner our autonomic-affective tensions influence the general tone of our striped muscles and this tonus, by stimulating the proprioceptive system of the striped muscle apparatus, determines the nature of the kinesthetic stream, hence, largely, the content of consciousness.* Sherrington illustrates the non-fatiguability of striped muscle tonus with the sexual clasp of the frog and the catatonic postures of man. We well know from experience that tremendous changes occur in the postural tensions of our muscles when we are affected by shame, fear, anger, disgust, or sorrow. It is generally accepted that the sexual clasp of the frog is maintained by a tremendous autonomic pressure of some sort, and it is quite obvious that catatonic postures in man and animals are defenses against causes of fear. In man the cause of fear is his erotic pressure which he cannot control.

³ Langelaan, J. W., On Muscle Tonus, Brain, Vol. XXXVIII, Part III.

⁴ Arch. de Physiol., 1917, 1, 257–261, Physiological Abstracts, 906.

⁵ Pflueger’s Archiv, 1916, 166, 145–168, Physiological Abstracts, 1638.

In order to discuss the relation of postural tonus of striped muscles to a man's character or personality it is necessary first to take up the *peripheral origin of the emotions or affections*. The theory of the peripheral origin of the emotions was advanced at about the same time by William James and C. Lange. As James formulated it,⁶ "*the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur is the emotion.*" Wertheimer's experiment shows that the perception of an exciting fact is not necessary to start typical autonomic-affective (emotion producing) reactions. He showed that by stimulating the nerve of an unconscious, anesthetized animal in a manner that would surely cause pain in a conscious animal, the contractions of the stomach stopped. This spastic postural state of the stomach is decidedly similar to the postural state that is assumed when the conscious animal shows the typical reactions of fear to an actually or potentially harmful stimulus. Hence, the first part of James' theory, although generally true, is not broad enough to cover the reflex autonomic adjustments that protect an animal from danger while it sleeps or is confused. Who has not been awakened by fearful tensions without knowing the cause, and then gradually become conscious of the fact that someone is in the room? Mothers who are nursing children often experience vigorous autonomic disturbances during sleep before they become aware that the child is in distress. We become conscious of dream images of urinating to find upon awakening that uncomfortable tensions of the bladder have probably been active for some time because of the unusual quantity of urine that has accumulated.

The latter part of the theory that our *feelings* of the changes (the afferent flow of nervous energy from the peripheral or visceral tensions) as they occur *is the emotion* is still considered to be the most satisfactory explanation of the origin and nature of the emotions or affections despite the fact that Sherrington's spinal dogs showed *fear, anger* and *disgust* after the vagus nerves were severed, and Goltz's dog showed only anger after its cerebral cortex was removed.

Although Sherrington isolated the abdominal viscera of his dogs from being influenced by cerebral activities, via the spinal cord and vagus nerves, he left the phrenic nerves and the autonomic ganglion chain intact. The dogs' behavior and dejected postural changes (the ears, face, head, etc.) upon smelling dog's flesh showed *only*, assuming that the abdominal viscera were so perfectly isolated that

⁶ Psychology, Vol. II, p. 449.

they did not react although the diaphragm surely must have reacted, that the autonomic segments of the thorax, neck and head also gave off an affective stream. Sherrington's experiments do not prove that the emotion, *as such*, has its origin in the cerebral cortex and then affects the viscera. When we excise the stomach and digestion still occurs we do not believe that the stomach has no digestive functions. Although such important physiologists as Sherrington and Cannon are inclined to accept the theory of the cerebral origin of the emotions and that the emotions in turn arouse the visceral changes, their experiments on the peripheral origin of hunger for food and the desire to urinate contradict their conclusions.

It has been shown by Mosso and Pellacani that when the intravesicular pressure is raised to 18 cm. the desire to urinate is aroused, and so soon as the posture or grip of the bladder on its contents relaxes the desire disappears. This certainly demonstrated that some *emissive-avertive* cravings are aroused by postural tensions in certain viscera setting up peripheral itching disturbances which, as a streams of nervous energy, compel us to make overt movements to relieve the hypertension. This point of view is the same as when we insist that the origin of a sensation of itching, due to an insect's bite, is at the point of contact or where peripheral changes are occurring and compels us to scratch or counterirritate the area.

Cannon and Carlson's work on the peripheral, intragastric origin of hunger shows that, here also, certain preceding and concomitant autonomic muscular movements and tensions arouse a local *itching* which constitutes a craving or hunger that is decidedly *acquisitive-assimilative* in its compulsions. *In our relations to the environment all our affections have either an acquisitive or avertive trend toward the stimuli in any environmental situation.*

The studies of the activities of the digestive, circulatory, respiratory and sexual systems, and adrenal, thyroid and hepatic glands, during affective states of *fear, anger, grief* and *shame*, show that changes in the postural tonus, contractile functions, and glandular activities occur upon the animal being exposed to potentially painful contact or distant stimuli.

What does this mean? According to the peripheral theory of the origin of the affective cravings or emotions it means that *whenver we feel affective or emotional reactions to a certain situation the autonomic apparatus, in some segment or segments, has assumed certain postural tensions which are giving off the afferent stream of feeling or emotion.* Now, then, these postural tensions or spastic adjustments may be extremely dangerous to the health

and biological future of the animal or individual if they cannot be readjusted. Cannon has shown that a painful stimulus or jeopardizing social situation (as a composite of stimuli containing a potentially dangerous factor) causes the digestive apparatus to assume postural tensions which are so decidedly afunctional as to be conducive to malnutrition and even autointoxication processes. Shifting of blood supply through changes in the postural tensions (regional vasoconstriction and vasodilation) of the blood vessels, changes in the activity of the adrenal and thyroid glands, the digestive glands, glycemia and glycosuria, and insomnia occur. Obviously such disturbances in the autonomic apparatus, if not readjusted, must seriously jeopardize the individual's biological career and self-control in his struggle for life and social esteem. If such autonomic stresses are associated with serious visceral lesions, such as pulmonary tuberculosis, pneumonia, typhoid or excessive fatigue, a serious catastrophe will almost surely occur. Also whenever organs are forced into chronic states of hypertension or hypotension, and their blood supply is persistently disturbed, they probably become more fertile soil for bacteria than the normally functioning tissues. (That is to say, the individual who represses the affective flow from certain vital or important viscera, because of fear of its influence upon his behavior, tends to have viscera that are more vulnerable to disease.)

How is a comfortable, healthful autonomic readjustment brought about? Obviously those animals which were compelled to make appropriate adjustments, because they felt distressing sensations when some segment of the autonomic apparatus was forced by metabolic needs or environmental stimuli into postural tensions that needed to be relieved, were more likely to survive. Through survival of the fittest man's autonomic apparatus acts according to a definite inherent law; namely, *that whenever any segments of the autonomic-affective apparatus are forced into a state of hypertension through metabolism, or endogenous or exogenous stimuli, they compel the projicient apparatus to so adjust the exteroceptors in the environment as to acquire the stimuli that have the capacity to produce comfortable postural readjustments in those particular segments of the autonomic apparatus.*

We see that the autonomic apparatus, when in the *fear* state, always compels the projicient apparatus to remove the receptors from the painful stimulus, and, if the compensatory reactions of *anger* follow *fear*, they compel the projicient apparatus to attack the painful stimulus and remove it from the receptor. Both the

fear and anger processes continue until they have acquired stimuli that neutralize the autonomic disturbance. We see this process in



FIG. 1. Elimination. Fear in anal erotic. Foot used as defense.

the frightened child running to its comforting mother; the angry allies still forcing demonstrations of humiliation, apology and

reparation from the enemy after they punished and defeated them in battle. We see the business man protecting himself against the fear of potential failure, through the insurance of his property, business and health; the penitent humbly begging to be forgiven and not punished; the maintenance of the church as a haven of refuge for the sad and miserable, and for the promise of fulfillment of our ungratifiable love and hate wishes.

The individual who is *ashamed* will be found upon analysis to be really *afraid* because of having misapplied a receptor to a stimulus; as in an error, accident, masturbation, etc. Likewise, *sorrow* is another type of fear reaction due to the loss of a stimulus, or person as a composite of stimuli, that aroused comfortable autonomic tensions; as a provident father, kind mother, sympathetic friend. *Disgust* is composite reaction of *fear* and *anger* in which the affect compelling the emission and aversion or destruction of the odious stimulus or situation is aroused by a reversed gastric and esophageal peristalsis and pharyngeal tensions that cause mild or vigorous nausea and reflex emissive-avertive movements. *Love* is a type of autonomic craving that compels the seeking for and cherishing of comfort-giving stimuli and its vigor is most intimately dependent upon the tensions of the procreative or sexual organs, the circulatory, respiratory and digestive systems.

The introspective analysis of errors and accidents due to brief, quick, undesirable, postural changes of a group of striped muscles (like the hand in its light postural grip on a good cigar suddenly relaxing sufficiently to allow gravity to pull it from the fingers) shows that *it is invariably due to a preceding quick reflex change in the autonomic-affective tensions*. It will be found that the autonomic disturbance was caused by a painful or embarrassing subject, as the stimulus, which we were unexpectedly made conscious of by some suggestion or suggestive situation. Sudden changes in postural tensions obviously may precipitate the most disastrous adjustments, as mutilating accidents or regrettable errors, misplacement of letters, words, valuable objects, the forgetting of or erroneous substitution of important, though embarrassing facts, proper names, and places, misinterpretations of critical situations and opportunities, etc. The influence of the repressed affections in causing accidents in operating machinery, overlooking danger signals and obstacles, as in handling aëroplanes, is enormous.

It may be well to sum up the discussion as it has been so far developed. Various autonomic segments, when they assume certain postural tensions and movements, cause us to become conscious

of streams of feeling or affective cravings which have their source in muscular tensions, and which, as the forces of the personality, compel the striped muscle or projicient sensorimotor apparatus to shift the exteroceptors about in the environment so that appropriate stimuli may be acquired which in turn restore the autonomic adjustments to comfortable or pleasing tensions; as the seeking for, preparation of, and eating of food, which, as a counterstimulus in the stomach, relieves the intragastric itching. This applies as well to sexual itchings, "itching for a fight," longing for a friend, home, "home-sickness," craving a smoke, drink, dance, game, notoriety, social esteem, to commit criminal or benevolent acts, etc.

The constant, immediate influence of changes of our autonomic-affective tensions upon our bodily postures, facial expressions and the content of consciousness (or thoughts) shows that the striped muscle's tonus is intimately, quickly controlled in some manner by the autonomic apparatus, and that the kinesthetic stream of sensations, which have their source in the tensions and contractions of the striped muscle acting upon the proprioceptors imbedded therein, accounts for the fact that our thoughts are projicient activities aroused to gratify our affective needs. The converging kinesthetic sensory streams that flow from the tensions and movements of the striped muscles or projicient apparatus form the great bulk of the content of consciousness. The converging kinesthetic streams coalesce with the converging exteroceptive sensory streams into images or mental pictures of environmental situations and problems. The converging exteroceptive, proprioceptive and affective streams producing the content of consciousness may be illustrated by representing each sense organ as a dot, and as the various sense organs become more or less active the dots would be more or less vivid, and as the sensory streams become associated and reassociated into concepts, so the dots would be grouped and regrouped into more or less definite well-balanced pictures or a confusion of pictorial fragments. The hallucinations or delusions are constituted of vivid kinesthetic sensory streams, which are aroused by an ungratifiable autonomic-affective craving. This wish-fulfilling kinesthetic stream coalesces with the exteroceptive reactions to an environmental situation in a manner that distorts the interpretation of the situation and the individual is unable to differentiate which elements are wishfulfilling and "imaginary" (imagery) and which are external realities, because the endogenous wishfulfilling sensory stream, when *vivid* and *persistent*, is as much of a *reality* as the environmental situation.

The delusion or hallucination is really produced by an uncon-

trollable autonomic-affective craving that has become dissociated from the *ego* and as such is convincingly felt to be a foreign body, person, power, or secret, destructive influence. Before the mechanism of dissociation can be satisfactorily discussed it is necessary to consider the influence of autonomic-affective segments upon the development of the *ego* and the *not-ego*; that is, the whole personality.

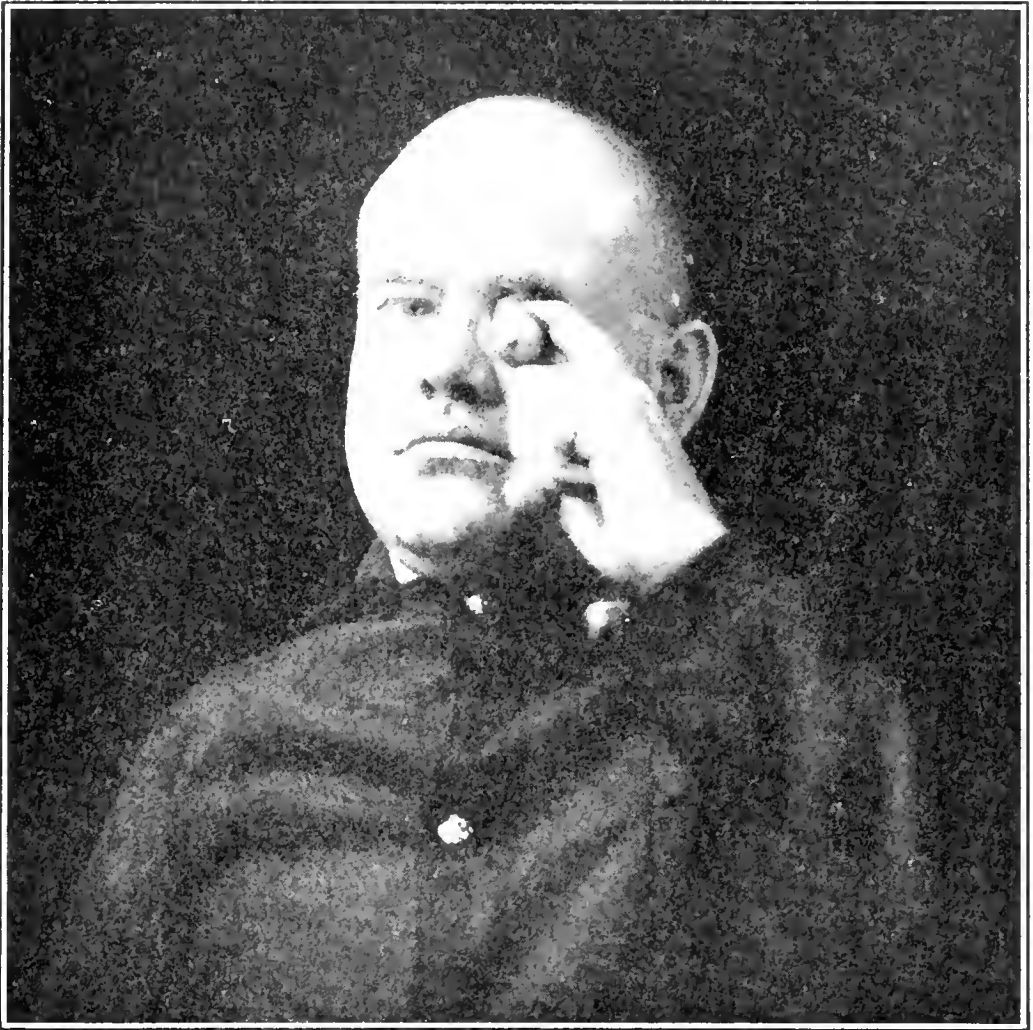


FIG. 2. Elimination. Castration of eyeball in deteriorating masturbatory dementia præcox type.

Bechterew, Watson and others have shown that the simple striped muscle-nerve reflex, as a minor segment, has the capacity to become *conditioned* so that it will react to an ordinarily indifferent stimulus after the stimulus has been associated for a number of times with the primary stimulus of the reflex; as the reflex extension of a toe or finger to a flash of light or an abrupt sound that has previously, *simultaneously* stimulated a distance receptor while a pain stimulus

was applied to the toe or finger⁷ When the toe reflex reacts to a light or sound stimulus *it has been so conditioned by an experience*. (Conversely the psychoanalyst assists the patient to recall or reproduce the forgotten but conditioning experience.)

Bechterew and his coworkers found that different segments of the autonomic apparatus of animals, fish, birds and people also have this capacity to become *conditioned* through experiences to react to stimuli which otherwise would have an indifferent effect. This explains why different people feel different affective reactions to the same situation; as one person feels indifferent to a color or form, a second dislikes it, or is nauseated by it, and a third is sexually excited by it. The parotid gland of one person may become painfully congested by the stimulation of a sour orange and later by the color of or the word-symbol (a sound) of the orange, while the gland of another person may be pleasantly congested. When we compare the preferences and aversions of a group of people we find that each one is different from the others in having different autonomic-affective reactions aroused by particular types of stimuli. We find that under certain conditions that give most of them pleasing reactions, some of the group will have uncomfortable, perhaps even fearful, angry, disgusted, sad, or erotic reactions.

Bechterew further showed that when a reflex became *firmly conditioned* to react to a certain associated stimulus (as an odor) that this stimulus becomes the foundation for a further conditioning (as to a sound that is later associated with the odor).

It might be possible to *condition* the reader to become aware of the significance of this physiological process by using some illustrations (at least he will be conditioned to remember the illustration). The deer is wounded by an object giving off a certain odor. After that the odor causes fearful tensions. Now the odor becomes associated with the sound of a certain thudding step, then this step-sound causes fearful reactions. A child has a boil lanced by a black-bearded surgeon, then all black-bearded men become fearful stimuli and even the father, if later black-bearded and not formerly pleasing, comes to have an additional threatening quality. The voice, touch, color, form, manners, affective attitude of the mother, come to have a most pleasing autonomic influence upon the infant through being associated with the nipple, cleansing, caressing, etc. The face, dress, picture, hobbies, policies of an admiring friend become more pleasing stimuli because of their associations with the

⁷ Different individuals vary and the same individual varies at different times in this conditioning capacity. It is no doubt greatly influenced by the autonomic-affective status at the time.

verbal caresses of praise, which in turn are, in their stimulating qualities, like the praises associated with the physical caresses experienced in infancy and childhood. In a similar manner erogenous

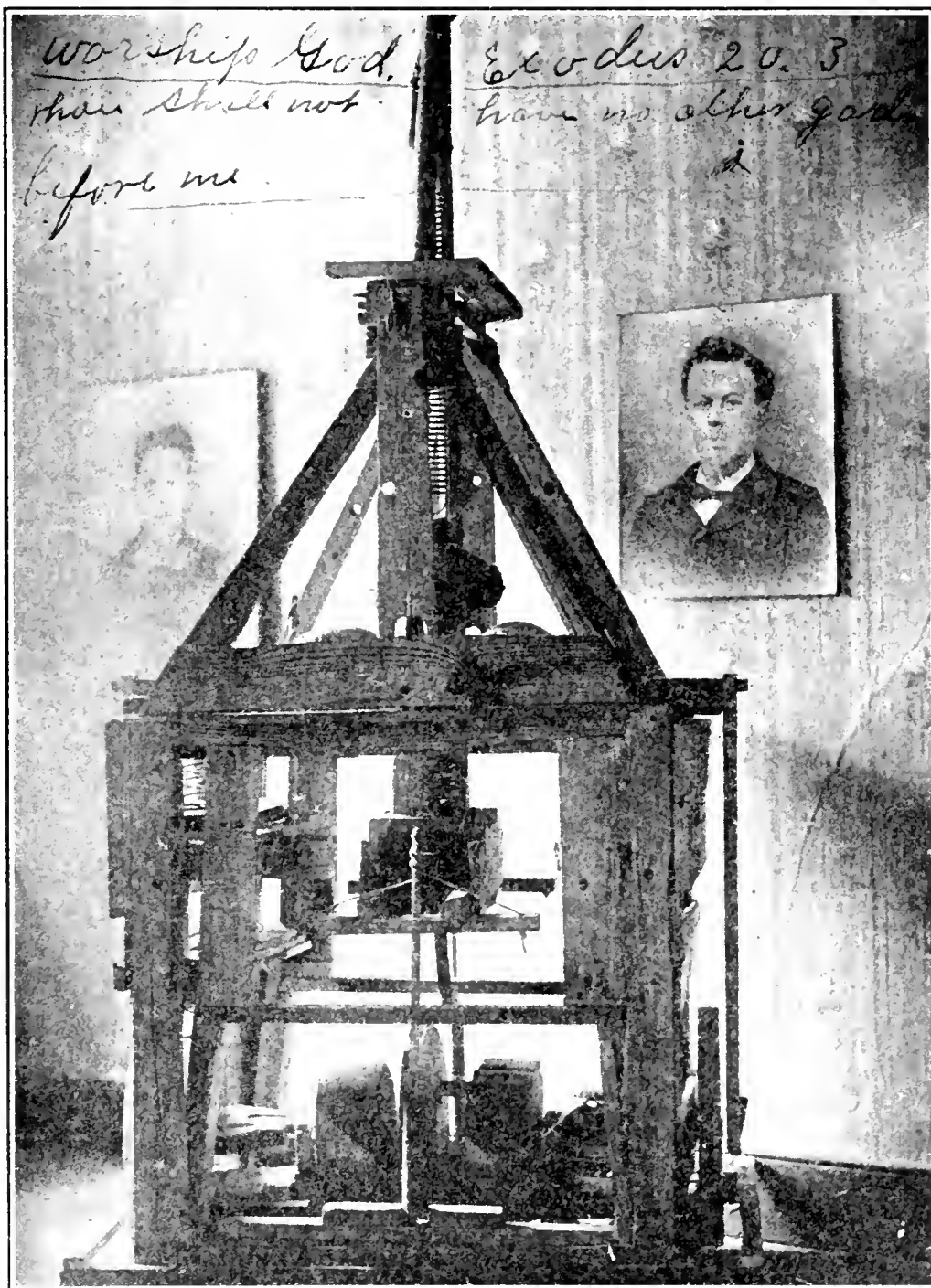


FIG. 3. Compensatory fantasy of potency by manufacture of perpetual motion machine in paranoid præcox patient.

zones become differentiated into having primary and secondary values. One mother hates to nurse the infant or to cleanse the anal excreta, and the child becomes *conditioned* to dread the experience.

which eventually causes the inhibition of excretory functions. Another mother derives such intense affective pleasure out of nursing or cleansing her infant that its autonomic apparatus uses these functions to dominate the mother, eventually making the zone the primary means of winning affections and favor. When the latter type of personality matures and develops the capacity to study himself he is astonished that despite his wishes to be refined the anus and excreta fascinate him. The conditioning influence of the father's personality upon the son, and the son upon the grandson, and so on for generations is of the utmost importance in accounting for the transmission of common family functional traits.

One boy, who has inherited a splendid physique, cannot be induced to join in athletic contests because he is *afraid* of being considered "awkward." Another boy, who has inherited undersized bones and defective vision, and would ordinarily be excused, even encouraged not to compete, indulges in athletic contests with comfortable self-confidence. One boy has been *conditioned* to fear his powers and the other to have confidence in them by the attitude of the parents. *The unconscious attitudes of our friends, enemies, parents, teachers, probably condition our autonomic-affective reactions more than what they say or consciously do.* This is shown in the universal recognition that "it is not so much what is said or done as the spirit or attitude with which it is said or done." The self-conscious mother becomes embarrassed at the clumsy failures (inferiorities) of her child and soon conditions the child to become embarrassed also instead of allowing the failure to cause laughter, pleasure and relief to others by favorably contrasting their own inferiorities. Our failures and successes, or relative inferiorities and superiorities (organic or functional) greatly condition our *fear* reactions and the manner in which we compensate or retract. Most people become aware of the fact that they have a superior or inferior organ (such as eyes, hair, hands, voice) because the compliments of others *condition* them to regard and use the organ accordingly. We know from numerous experiences that the emotional reactions of others (such as fear, anger, disgust, scorn, love) to a situation or person about which we are unfamiliar *condition* us to react in a similar manner particularly if we like the person who is showing the affective reaction. The daughter who loves her mother, but whose mother is abnormally prudish about her sexual functions, will surely be conditioned to react in a similar manner toward her own sexual functions, unless differently conditioned by the influences of another person.

It is obvious that civilized man as well as primitive man selects his fetiches and symbols according to the *conditioned* nature of his autonomic cravings, thereby supplying fairly satisfactory substitutes when the original stimulus cannot be acquired.

The *conditioning* capacity of the reflex is of the utmost importance in determining our selections and aversions throughout life, such as mating, habitat, friends, enemies, vocations, professions, religious and political preferences, etc. We can understand now how we come to have an aversive prejudice for one person, experience or object because it has qualities that happen to be similar to some of the qualities that another person, object or experience had that caused us to feel pain, fear or embarrassment. Similarly we prefer those new things that have some of the qualities of old things that were pleasing and invigorating stimuli.

Because all objects and situations are composites of stimuli and some stimuli are met with in all sorts of offensive and inoffensive mixtures with the primary stimuli of different autonomic segments (parotid, gastric, rectal, genital, etc.), a quite complex autonomic reaction may occur in a rather simple situation. These reactions may be very conflicting in their compulsions, such as to feel *love* and *fear* in the same situation, as in the case of a woman who desired a divorce in order that she might marry a *certain* man, who excited vigorous love reactions for her—but who was already married. Innumerable times a day her affections reviewed the situation: he might not get a divorce (fear), he might get a divorce (pleasure), her divorce might deprive her of her child (fear) or expose her life (fear), but would free her from a disgusting, impotent husband (pleasure).

The manner in which stimuli are intermingled in the environment has no doubt a most important influence in integrating the reflexes into minor functional unities and the unities which are similarly *conditioned* to seek or avoid certain environmental situations become integrated into a major *unity*. It is obvious that certain autonomic segments may become conditioned through experiences in childhood and youth and maturity with playmates and adults to become *depressed* by stimuli that *invigorate* the same segment for the majority of people and this segment may become conditioned to become *hyperactive* in the presence of stimuli that are utterly *perverse* and have a disastrous biological and social influence. We must always bear in mind that every individual and every situation is a composite of stimuli for which we may be *conditioned* to have fearful, angry, shameful, erotic, jealous, etc., reactions at quite the

same time. These affective streams may blend together, like so many brilliant colors, into a drab, confused, unpleasant, apathetic mixture or a pleasing composition. Further, we may be *conditioned* by an old experience to feel strong affective reactions in a given situation without being clever enough to pick out the particular stimuli that cause it.

It is easy to see how a situation or person may happen to be so constituted for us as to arouse vigorous but conflicting autonomic-affective reactions, such as love and fear, or love and shame. In one instance the coyness and affections of a young man's wife was most pleasing and stimulating, but the hair on her legs had a sexually depressing effect and aroused no little disgust, which in turn, compelled him to have his wife remove it.

This brings us to the struggle of various autonomic segments to obtain control of the final-common-motor-paths with *suppression* or *repression* of antagonistic *cravings*, and the compensatory development of the *ego*. The autonomic segments have but *one means* of acquiring the appropriate stimulus and that is by controlling the striped muscle or projicient apparatus in order to appropriately expose the receptor.

Sherrington's⁸ discovery, that two or more *afferent* neurones, converging upon a neurone that is *efferent* to them, may be *allied* or *antagonistic* in their influence upon the efferent neurone, is a most fundamental contribution to psychophysiology. It means that a course of behavior or thought is the *resultant* of converging affective forces or autonomic segments trying to control our behavior in order to obtain gratification for their needs, and in this respect Freud's notorious *censor* is physiologically correct.

At birth the autonomic apparatus works as a quite congenial unity, because of its parasitic dependence upon the mother, and its irresponsibility. But when the mother begins to *condition* the segmental functions (such as nursing, urinating, defecating) to become active under certain conditions, so as to fit into the routine of a relatively narrow, conventionalized, social group, then the compulsive gratification of autonomic needs clashes with society's insistence upon the development of self-restraint, self-control and self-refinement. Heedless self-indulgence by an individual, at any age, causes uncomfortable autonomic tensions (disgust, anger, fear) in his associates because such attitudes threaten their own freedom. Hence, the individuals of the group are compelled to control the encroaching tendencies of the asocial individual even in its early childhood.

⁸ Sherrington, C. S., Integrative Actions of the Nervous System.

This is done by "training" (*conditioning*) the autonomic segments of the infant to react to certain stimuli, as certain voice sounds indicate the time for nursing, or the approval or disapproval of conduct, and by arousing a more or less mild or severe *fear of losing esteem and favor* when the parents' wishes are not heeded or fulfilled. The child needs petting ("mothering") and its severest punishment is the loss of the favor and esteem of the playmates and elders which it has become conditioned to *love*. Soon the infant (particularly upon weaning) experiences its first tragedy, that of being denied certain segmental pleasures, as sucking the breast; and later, excreting in order to feel the warm fluids and have the attentions of the parents during the lonely night. The fear of losing the kind father's or mother's or playmate's esteem, like all *fears* that are not too severe, initiates a vigorous *compensatory striving*⁹ of the autonomic apparatus to prevent the loss of esteem through a segments self-indulgence, and this compensatory striving is *conditioned* to develop an estimable self-control and self-refinement, according to the wishes of those who are loved. *The compensatory mechanism and the socially conditioned segments become knitted or integrated into a UNITY which controls the individual autonomic segments through controlling the final-common-motor-paths for overt movements.* The mild, as well as severe, incessant *competition* between individuals who have similarly conditioned segmental cravings (to nurse at the same breast, to be petted by the same teacher or parent at the same time, to win the same game, the same girl, the same job, the same honor, etc.) stimulate the growth or development of a more and more efficient compensatory mechanism in order to prevent the fear of failure. This compensatory unity becomes the *ego* and eventually differentiates itself from the segment as "I" and "mine" or "it."

Within a few years after the infantile *ego* begins to form we find an occasional tendency to refer to itself in the third or second person and finally occasionally in the first person; then at last, more or less consistently, in the first person. Now the *ego* comes to regard itself as "I," "me," or "myself," and the segmental functions are regarded as "mine," "my arm," "my stomach," "my pain," "my joy," *so long as they support the ego's struggle for social esteem.* If the stomach or face tends to assume the anxiety state under conditions which indicate cowardice or social inferiority, we have the *ego* refusing all responsibility or ownership and even hating the

⁹ *Compensation* is one of the most fundamental attributes of living tissue and is to be found throughout the biocosmos where pain and fear occurs.

stomach or face as a foreign influence or inferiority. The youthful *ego* often refers to this influence as belonging to a naughty person and sometimes even names it after some playmate that it dislikes. The dissociated personality does exactly the same thing, and most people treat their dreams with the same attitude of disownership during the dream.

The *ego*, as a highly but delicately integrated autonomic unity, must constantly adjust to the activities of any of the major or minor autonomic segments; and the segment, by gaining partial control of the striped muscle apparatus, causes the *ego* to become *conscious or aware* of kinesthetic streams which coalesce into perceptions and conceptions of what is needed by the segment. Consciousness may be defined as the body reacting as a unity to the special or sensational activity of one or several of its parts or segments. If the segment gains complete control of the striped muscle apparatus and cannot be justified or supported by the *ego* it is horrified to see itself acting overtly to gratify the wish or segmental craving; as where, when and how to steal food when famished, or the adolescent's compulsion to masturbate dominating him when erotic.

The segmental affective cravings know no social law and often jeopardize the personality by forcing it to do something that happens to be unjustifiable, illegal or immoral if not duly restrained. Most people have to be constantly on guard against what they call their "baser passions" in order not to allow themselves to yield to the craving so far that self-control cannot be reestablished. Individuals vary greatly at different times in this respect. This universal struggle of the genus *Homo* is no doubt due to the fact that he is an ape that has learned to wear clothing, use word-sounds and word-signs, and can foresee, in a general sense, the future biological and social results of certain indulgences. When the segmental craving is allowed to cause the organism to become conscious or aware of its needs, but is not allowed to cause overt movements, it may be said to be *suppressed*; and when it is not even allowed to cause awareness of its needs it may be said to be *repressed*. *There is a distinct and important functional difference between the freely active, the suppressed, and repressed autonomic-affective functions.* We may have a *summation* of *suppressed and repressed* cravings which, although unable to directly dominate the *ego* may become *dissociated* and, becoming uncontrollable, cause wishfulfilling delusions, hallucinations, mannerisms, compulsions, obsessions, etc., despite the *ego's* resistance.

The *repressed* autonomic segment, like a compressed spring,

needs but the slightest environmental opportunity or relaxation of the repressing attitude of the *ego* to obtain control of the projicient apparatus and cause the individual to be conscious of its needs as it seeks for physiological neutralization; as when we suppress our anger, shame, sorrow, disgust, in order to keep up appearance of being calm, and then spontaneously make an inopportune remark which reveals the anger. We see this demonstrated daily in the dreams, errors, and accidents of the average mind. In the anesthetic room, where patients struggle to keep their repressed wishes and cravings secret, and in the delirium, whether the *ego* is weakened by drugs, toxemia or fatigue, we find a rich use of imagery and symbolism that, more or less, plainly reveals what the asocial, repressed autonomic-affective cravings are striving to acquire. One oral-erotic, auto-erotic young man, who was being anesthetized to have the thyroid gland removed, struggled to prevent becoming unconscious, showing marked anxiety about something. The thyroid was to be removed because persistent choking sensations of two years' duration were supposed to be due to the pressure of an enlarged gland. (The choking later proved to be due to pharyngeal and laryngeal tensions of an oral erotic origin.) When the *ego* finally became stupefied and weakened by the anesthetic, hallucinations of assault by a "devil" and wild attempts at masturbation began, showing how the masochistically conditioned autoerotic segmental compulsions finally dominated the *ego's* fears of losing esteem when it was weakened by the anesthetic. Such incidents show also how much more delicately the *ego* is integrated than the segmental functions.

The *infantile ego* usually becomes able to control the compulsion to defecate before the compulsion to urinate, because the latter is less disastrous. The childish *ego* becomes able to prevent either during the day, but often, then occasionally, loses control at night, and the *adolescent ego* finally masters the segments completely. When we become fatigued or depressed, or when a segment becomes too vigorous, as intragastric cravings, we find it difficult to keep from becoming conscious of wierd, stereotyped thoughts, quotations, visual pictures, or prevent making errors that gratify our suppressed wishes, showing how they urge themselves upon the *ego* to be gratified. We also know that when our segmental cravings are allied to our egoistic cravings that we have a great increase in energy and ability to coördinate our functions for work. Hence, the man, whose autonomic segments have been conditioned in youth by the wise, generous influence of his matured associates so that

their needs support the ego's struggle to become socially estimable, develops gigantic capacities for work. All variations of conflicting but deadlocked affective cravings are to be found ranging from commonplace half-heartedness, to apathetic indifference, to hopeless depression.

The repressed cravings are bound up in visceral tonicities which may endure for years and are to be found in the characteristic postural tensions that constitute ("reveal") the "character of the individual"; as in the exhibitionistic strut of the arrogant narcissus, the sullen, shut-in resistiveness of the secretly autoerotic, the stable attitude of the courageous, the shrinking attitude of the timid and the slinking attitude of the cowardly intriguer; or the aresonant voice showing the suppressed avibratory tensions of the vocal cords. In one case this was due to the repressed hatred for the father which was constantly urging him to shout out a denunciation, which he dared not risk because he could not "speak calmly."

This now brings us to the tonus of the autonomic segment as a cause of abnormal behavior. When a segment has been conditioned through experiences in childhood to react to the presence of certain stimuli (as gastric reactions to the forbidden apple) the youthful *ego* may be overwhelmed and the segmental cravings compel the boy to steal; or under exciting conditions to indulge in segmental masturbations, nocturnal enuresis, etc. As the *ego* grows more powerful it becomes able to control, quite easily, the overt activities of most of the segmental cravings except the sexual. They often become much too vigorous and, when normal, are naturally justified under certain conditions so that they are permitted to control the personality. When, however, the personality regards them as shameful inferiorities, either because they crave biologically perverse stimuli or because the *ego* has been conditioned along prudish, unnatural lines, the individual becomes forced into an abnormal course of adjustment; abnormal because of the severe autonomic conflict that develops. *The course of thought and behavior is the mechanical resultant of autonomic-affective forces converging upon the striped muscle apparatus to obtain control of it.* The abnormal course of behavior, as the psychosis, whether it is influenced by organic, toxic or purely affective compulsions, or a mixture of all three, is, however, the resultant of converging allied and antagonistic cravings.

The current symptomatological classifications of psychoses are not true diseases and it is most sterilizing and misleading for psycho-

pathology to consider them as such.¹⁰ The psychoses are *always resultant courses of behavior and are symptomatic of definite, conflicting autonomic-affective cravings striving to obtain gratification at the same time with the same means—the striped muscle system.* (It is most misleading to assume that “the brain is the organ of the mind.”) The cerebrum is the chief ganglion developed upon the distance receptors and the cerebellum is the chief ganglion of the proprioceptive apparatus, (Sherrington, Hughlings Jackson).

The personality is naturally divided by the *ego* into the affective cravings that support and constitute the *ego* and the cravings that the *ego* must control, refine or eliminate. This may be expressed by the formula:

$$\frac{\text{Manifest primary wishes} + \text{subsidiary wishes (ego)}}{\text{Repressed primary wishes} + \text{subsidiary wishes (non-ego)}} \times (\text{opposed by}) \text{ the Environment} = (\text{results in}) \text{ the Behavior.}$$

Given the *behavior* and the *environmental conditions*, we may infer what cravings were active (diagnosis).

Given the *behavior* and the *cravings* we can infer what the environmental conditions were.

Given the *cravings* and the *environmental conditions* and we can predict the behavior (prognosis).

The psychopath gives us a camouflaged, prejudiced account of his manifest wishes to be socially estimable; his distressing visceral tensions, mysterious hallucinations, his environmental obligations, are his behavior or methods of adjusting. He has little or no insight into, that is, consciousness of, the repressed cravings, which cause the distressing visceral tensions, disagreeable compulsions, phobias, dreams, errors, accidents, delusions, hallucinations, etc. If the dissociation has not progressed so far as to convince him that the delusions and hallucinations are thoughts caused by influences that are foreign to his personality, such as hypnotic forces, devices, enemies, God, secret societies, he may admit ownership by speaking of them as “imaginary,” but uncontrollable.

The *ego*, in its dilemma with the incessant pressure of the *suppressed* and *repressed cravings*, naturally reacts to them in one of three general ways. They are felt to be either—

- (1) *unjustifiable* but *gratifiable*, as the perverse or autoerotic,
- (2) *unjustifiable* and *ungratifiable*, as an incestuous love,

¹⁰ See the Mechanistic Classification of Neuroses and Psychoses Produced by Distortion of Autonomic-Affective Functions, *JOUR. NERV. AND MENT. DIS.*, Vol. 50, No. 2, August, 1919.

(3) *justifiable* but *ungratifiable*, as craving for maternity, or some dead, departed or indifferent person.

The *justifiable, gratifiable* cravings enormously invigorate and support the *ego* in its struggle to be *good, virile* and *happy*; that is, biologically and socially potent, and this is the adjustment that **must** be brought about by compromising the course of the *ego* with the



FIG. 4. Affective regression to intrauterine attitude of dependence and simulation of the intrauterine state.

repressions and if possible reconditioning the affections after they have been accepted by the *ego*.

My experience with psychopathic personalities of most types is that they all suffer from autonomic-affective cravings which they cannot allow to dominate their behavior, or cannot find relief for through acquiring the appropriate stimulus, and I wish to show by

a series of briefly abstracted cases that the craving is so often located in the postural tensions of particular visceral segments that it is probably a consistent thing even if not always discovered. Like the famishing influence of protracted hunger, which originates in the stomach, or the severe itching of an area of skin, the cravings from this hyperactive segment finally determine the adjustments of the entire personality. This in turn may set up a desperate, reflex, compensatory striving to *eliminate* the craving from the personality; or eventually lead to a resignation of the *ego* to its influence with a social *regression* so that it may enjoy the gratifying postural tensions and vivid sensory images that simulate the reality (as the simulation of pregnancy) without caring for social esteem. In the demented individual after the *ego* is destroyed, the organism overtly seeks the reality without any longer feeling *fear* and *shame* or caring for social esteem.

In the different types of *suppression neuroses* (under this heading might be included the so-called hypochondriacs, paraphrenias, psychasthenias, neurasthenias and mild depressions) we find, consistently, *fear* of a threatening environmental situation which cannot be avoided, or of an irrepressible, unjustifiable, autonomic craving which cannot be relieved because it tends to jeopardize the personality; as the depression and anxiety of the autoerotic or homosexual who is trying to reform himself and is compelled to deny himself that which he thinks he loves.

In the *repression neuroses* or *psychoneuroses* (under which might be included the phobias, obsessions, compulsions, functional paralyses, postural distortions, anesthetics, etc.) we find, consistently, a desperate attempt by the *ego* to coördinate its power in a manner that will prevent the repressed, terrifying cravings from causing the *ego* to become aware of their needs; which is the *elimination* or *castration* form of self-defense. Or the *ego* regresses to a lower biological-social level and yields to a heedless indulgence of the segmental craving by allowing it to cause the *simulation* of postures which will gratify the craving, as copulation postures and the distended abdomen of hysterical pregnancy, homosexual crucifixions, stealing fetiches, or indulging in vivid fancies, etc.

The nature of the adaptation of the *ego* to the segmental craving cannot safely be said to be due to an inherent or congenital determinant because the analysis and recovery of such cases show that the adjustment of the *ego* to the repressed affections is due to the manner in which the *ego* has been conditioned by other people, particularly relatives. In a series of cases I have been able to trace the

origin of the pathologically conditioning influence of a mother upon her daughter to the grandmother, with many indications that the great grandmother was a pathological influence in turn. *Family functional traits are no doubt transmitted through conditioning the autonomic functions.*

In the *repression or dissociation neuroses of the paranoid type* we find an incessant striving to reach the level of true biological potency—that is, heterosexual potency in which the sexual act produces sufficient autonomic-affective gratification and gives the individual a spontaneous sense of power and well-being. The individual who cannot maintain this level and its social obligations is compelled to resort to all sorts of excitements, novelties and devices to stimulate his reactions, and if he *fears* the tendency to homosexual submissiveness he compensates desperately, eccentrically, with all sorts of schemes for making himself potent. Particularly, he becomes an inventor, prophet, creator, superman, reformer, etc. He tries to become omnipotent because his tendency to become sexually impotent and submissive to virile males terrifies him.

In the *paranoid type of pernicious dissociation* the personality is obsessed by the dissociated segmental cravings, in their seeking for gratification, causing him to have fearful hallucinations and sensory disturbances of being hypnotized and sexually coerced or assaulted. Finally, believing that the sensory experiences are caused by another personality or secret society, he becomes lost in a pernicious eccentric compensation, or yields to the fanatical crucifixion which disguises his erotic cravings to be crucified to the potent, virile aggressive male. Such psychoses are particularly common where men are isolated in large groups and rigorously subordinated to one another (as in armies, navies, prisons, monasteries, etc.).

The true *catatonics* submit to these hallucinations and vivid sensory disturbances enjoying them thoroughly, although afraid of their inability to adapt to the virile members of the same sex who naturally have attributes that excite the crucifixial cravings. They often pass through a sexual orgy, and seem to recover after having enjoyed erotic gratification, death of the personality and rebirth.

The *hebeephrenic* types of adjustment are essentially a *regression* of the egoistic methods of winning social esteem to an adolescent or an infantile, heedless attitude of indulging in excretory erotic cravings. They tire of striving to win social fitness and regress to a level of utter social irresponsibility and naïve wishfulfilling fantasies, hallucinations and polymorphous sexual interests.

In the *manic-depressive* adjustments we seem to have *two* types of

manics and *two* types of depressives. In the manic compensations we have the periodic *joyful abandonment to the erotic cravings*; or the wild, *bluffing, compensatory demonstrations* of power and self-control to prevent yielding to the terrifying erotic pressure. In the *depressives* we have a wild, incessant, stereotyped stream of thought about dire catastrophes and sexual sinfulness as an *anxious*

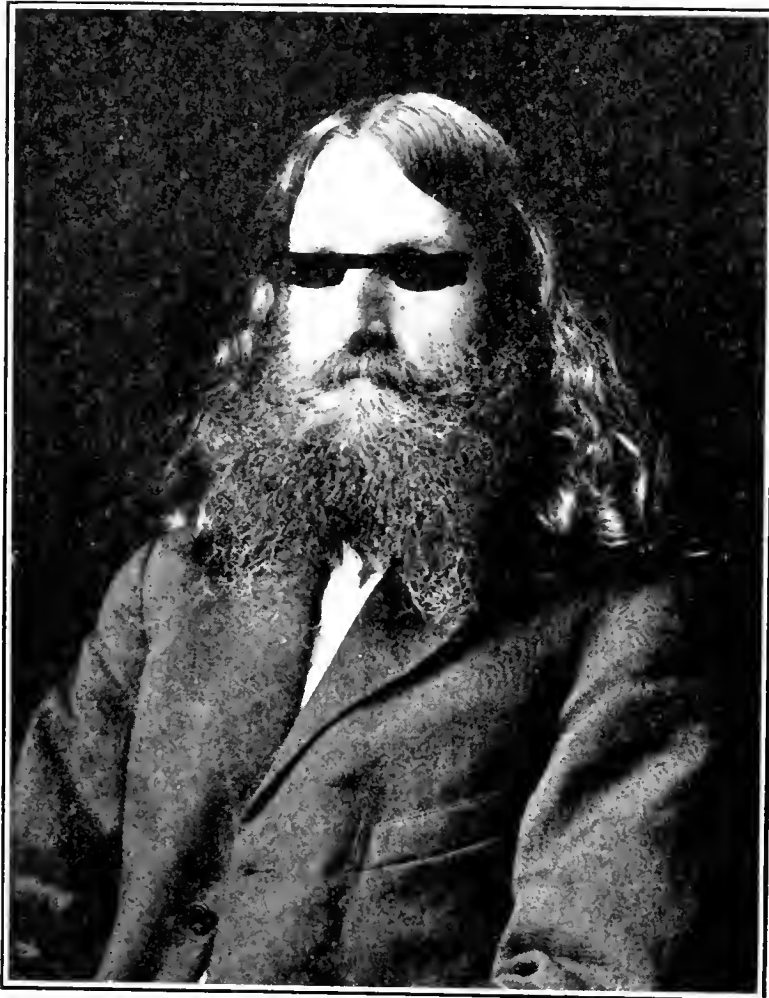


FIG. 5. Simulation of the perfect man to please the father. Name Grover Cleveland.

defense against the autoerotic or perverse sexual pressure; or a complete *renunciation* of all affective interests of a mature nature followed by a serious *regression* to the nursling or even intrauterine level of obtaining comfort.

In some cases of regression it is a relatively benign episode of a few months' duration; in others, which are more like pernicious deteriorations, it may be followed by feelings of having died and passed through a rebirth. These cases emerge from the regression with a distorted, socially impractical system of fancies of having

eliminated the "sinful," socially unjustifiable affective cravings in order to begin life anew. This adjustment of keeping the *ego* unconscious of certain cravings works so long as the individual lives in a protected, noncompetitive environment; otherwise an eccentric overcompensation is due to occur that will eventually lead to another psychosis or finally a permanent distortion of the *ego* and the whole personality.

Various solutions of the *conflict* between the *ego* and the intolerable segmental cravings may occur. Either the *ego* absolutely represses the craving and sublimates in a creative career (artistic, religious, philosophical or scientific), or the *ego* finally regresses to a level that tolerates the craving and joins a similarly constituted social group so as to avoid censure and yet win some esteem; or the segment eventually destroys the egoistic integrations and freely pursues its primitive erotic course.

The different methods of struggling with and adjusting to the jeopardizing cravings, that are ungratifiable or are unjustifiable, so as to prevent the *fear state* of the autonomic apparatus may be illustrated by a series of briefly abstracted typical cases.¹¹

SUPPRESSION NEUROSES

CASE A.—The judge of a circuit court suffered for years from a chronic distressing tension of the stomach. The tendency to spastic amotility, and inability to secrete normally, and digest foods was decidedly of the gastric-*fear* type of adjustment. He refused to recognize the possibility of a *fear* cause in himself or his business and treated the symptoms by progressively reducing his diet until it finally consisted chiefly of *milk* (gratifying the nursing mother attachment).

The analysis of the man's affective cravings showed a profound *love* fixation upon his lonely old mother despite the fact that he was married and had children. Upon her final illness and death the loneliness and sadness of the man (a type of fear state due to the loss of a comforting stimulus for which a substitute was incessantly sought in his chronic attempt to win nursing and sympathy) continued until he allowed himself to become aware of the true nature of his interests in his mother. Following this affective readjustment he pursued a more rugged, "sensible" course of behavior and became very grateful for learning to know himself.

CASE B.—A young man, married, having cerebrospinal syphilis, was in an incessant, severe anxiety state for months because of *fear* of having seminal emissions without an erection or sexual excitement.

¹¹ These cases, with others, will be presented, in full, to show not only the repressed cravings but also how they become *conditioned*, in a volume on "Psychopathology."



FIG. 6. Simulation of perfect man like the father. Russian Jew, undersized, 18, uneducated, ambitious, bought large man's suit with idea of appearing like a man and growing to fit it.

The irritating feeling of being about to have a seminal loss, he located in his penis—the urethral tract, indicating a chronic urethral spasm. He persecuted himself for having ruined himself by masturbating since an adolescent.

CASE C.—A large, vigorous, loud, exhibitionistic officer of 45, complained of an awful *fear* of dying suddenly from “heart disease” or “the rupture of an artery in the brain” due to high blood pressure. His blood pressure ranged from 180 to 200 mm. Upon a psychoanalysis he became aware that his *fears* of cerebral or cardiac hemorrhages were due to the fact that three of his immediate relatives had had such catastrophes and it was often suggested by his mother (conditioning influence) that it was “in the family.” But it further developed that he was very erotic. Although, for him, woman stood for syphilis, gonorrhea, pregnancy, blackmail and scandal, he was trying to show himself to be a ladies’ man when in reality he was decidedly excited by homosexual situations. Upon obtaining insight he made a common-sense adjustment, stopped his dilletante, polite, erotic flirtations and his blood pressure dropped to below 170 mm. The fall of blood pressure was probably the abeyance of the autonomic striving to avoid the cause of *fear*.

REPRESSION NEUROSES

CASE D.—A pernicious *mysophobia* in a young unmarried woman of about 25 (diagnosed dementia præcox) had existed constantly for over a year. It began with the *repression* of her anal-autoerotic indulgences and subsided when, upon a psychoanalysis, she recalled that the obsession of being “contaminated” began with an erotic incident while working with her sister in the kitchen. She was having incestuous fantasies about her father while menstruating and wearing a cloth made from his underwear and allowed the passage of feces into her clothing; as a *simulation* of the sexual act. The *fear* of being discovered and understood by the sister compelled the repression of the segmental cravings and a violent concentration upon getting “clean,” manifested in almost incessant washing. The *resultant* course of behavior remained *fixed* until she was able to allow herself to become conscious of the repressed cravings and make the confession that she felt compelled to make in order to be able to again face her people without hiding her secret indulgences.

CASE E.—Of anesthesia, convulsions, vomiting, visual constriction, erythema and itching of Mrs. V .G.—¹² showed definitely how the *fear* of the consequences of allowing the affective cravings of *hate*, *love* and *shame* a normal freedom of adjusting, forced her to *repress* the affections by coördinating all her powers on the things that she was most vividly conscious of during the crises with her grandmother and mother-in-law. Thus the neurotic convulsions, anesthetics, vomiting, visual constriction as an anesthesia, erythema and itching were the *resultant* of the repressing egoistic wishes to be esteemed and the repressed jeopardizing cravings of hate, shame and a secret love.

¹² Reported in full in The Journal of Abnormal Psychology, April, 1917.

PERNICIOUS DISSOCIATION AND COMPENSATION NEUROSES

CASE F.—A soldier, age about 35, illiterate, unmarried (see illustration I), shows a profound functional distortion compelled by the autonomic compensations to prevent going into a panic because of the vigorous pressure of the anal-erotic cravings. These segmented cravings tend to dominate the organism or personality and force it into segmentally pleasing but socially disastrous positions, hence the violent compensatory defensive distortion of the striped muscle apparatus.

CASE G.—A soldier, age about 25 upon admission (see illustration II). This personality was absolutely dominated by autoerotic compulsions (shown in his chronic masturbation) and probably anal erotic cravings (shown by his love for filth and waste). The castration of the eye is a vain compulsion to save the *ego* from destruction by *eliminating* the visual erotic receptors. (The left eye is now blind and the right has been very much damaged by this compulsion to gouge them out with his fingers.) The case reminds one of the tragic self-castration and punishment of Œdipus.

CASE H.—A vulgar woman derived great pleasure out of abandoning herself to hallucinations of heterosexual assault and the erotic compulsions of abdominal postures that simulated pregnancy, but was terrified by the hallucinations of homosexual assault.

CASE I.—A prudish spinster of 54, a teacher of physiology and nature study, became absolutely frantic upon feeling similar uncontrollable *simulations* in herself and autoerotic compulsions.

CASE J.—Married man of thirty developed paresis about four months after his marriage. Following the marriage he worried (fear) about his inability to copulate satisfactorily. The psychosis was characterized by wild compensatory claims of enormous potency, ability to explode dynamite by mental concentrations and make girls love him by hypnotizing them with his eye. He developed a ptosis of one eye before his marriage.

CASE K.—Was an arteriosclerotic old man, who constantly tried to demonstrate his physical skill and power, claimed that he had great sexual potency and talked a great deal about having invented a powerful drill for boring into the (most resistant) "hardest rock." This behavior proved to be a defensive compensation for the *fear* of being hypnotized or coerced into submitting as the sexual object of a young man who slept near him. The *ego* was afraid that the segmental erotic cravings (heterosexually impotent but homosexually erotic) might force him into a socially ruinous position.

CASE L.—A paretic sailor with splendid physique claimed great physical and mental powers but also suffered from frightful hallucinations of oral homosexual assault.

CASE M.—A soldier shot and killed two soldiers whom he believed were developing the power to force him to submit to homosexual assault.

In reality his dissociated erotic cravings were forcing him into such relations with the other men, but the *ego* destroyed the erotic stimulus. Since the murder this man has similar delusions, that is, compulsions toward some of his attendants and companions. (Two young men having similar compulsions, which they recognized as originating in themselves, committed suicide.)

CASE N.—Is a married negro of about 40. He is effeminate and a religious zealot. He claims to be a prophet inspired by God. Upon divine command he built a "perpetual motion" machine (see illustra-



FIG. 7. Anal erotic gratification by squatting posture.

tion III) which is the "first church" in which the "blood of the world is mixed." The dilapidated structure, built of pieces of boxes, some old springs, the well of an oil lamp and sections of a barber's pole, has a square frame base and a pyramidal superstructure. From the apex of the pyramid a hand (of God) is suspended and from this hangs a long spring to the lower end of which is attached the well of the lamp.

The bottom of the lamp is attached to a horizontal board which rests upon two bed springs. By pushing down on this board the bed springs are compressed and the long spring is stretched, hence they work against each other and shake a series of levers. The oil well is

filled with sand, which he calls "manna" (sacred food) and as the well pumps up and down in the pyramid the sand is sprinkled into the large square frame in which "the blood of the world is mingled." The long spring and oil well with the emitting sand symbolizes the ejaculating penis, the pyramid is the vagina and the square frame, which contains the "cherubs" is the uterus. This copulation fetich is placed between himself and his mother (his childhood love-object) and he claims to have created omnipotent power.

The diagnosis was heterosexual impotence with pernicious fear of becoming uncontrollably homosexual. (Oral erotic—sacred manna.) He was discharged by a jury as not insane, but upon sending the President a letter, urging the adoption of the cloth of a menstruating woman for the American flag, he was returned to the St. Elizabeth's Hospital.

Upon the first admission we could get no information from him, but on his return he said that a man-child in his wife's uterus "snatched" and "bent" his penis so that he could not copulate. This was later followed by the divine compulsion to build the omnipotent machine. He had always suffered from ejaculatio precox and his effeminate manners (postural tensions) show the biological course he is struggling against.

CASE O.—Was another negro who built a similar omnipotent device and felt the compensatory inspirations to lead his people. Fearing assault and persecution he finally ran amuck and slew several people before he and his wife were killed by the police.

CASE P.—A clever young mechanic, designed at great labor a mighty smooth-bore cannon. After the War Department turned it down as impractical he began to hallucinate that he was talked about for having allowed the Germans to have the plans. The hallucinations gratified the wish to have his invention (compensation) recognized. He became anxious, sleepless and finally sought insight. The psychoanalysis brought out many eccentric compensations, heterosexual frigidity and the fear that he had an undersized penis.

CASE Q.—Is a young colored woman who has made several attempts to commit suicide. In the illustration (No. IV) she is seen suspended before the window of her dark room. This is the *simulation* of the intrauterine position and is the result of becoming discouraged and making an affective regression to a level that can be most comfortably gratified.

CASE R.—Shows the low level to which a personality can be reduced when the anal-genital segments develop an uncontrollable auto-erotic influence over the organism. The apelike squatting posture of the body plainly reveals the prominence of the erotic segmental cravings and the feeble interest of the *ego* in social esteem. (See illustration VII.) This type of anal segmental domination of the organism and

destruction of the *ego* should be contrasted with violent attempts of the *ego* to "get clean" (Case D) and eliminate the anal erotic compulsions (Case F).

CASE S (illustration VI) is an interesting *simulation* of the father himself by an organically and functionally inferior (uneducated) post-adolescent Russian immigrant. He bought a big man's suit to satisfy the compulsion to become a big man. The *fear* of inferiority was easily relieved in this boy by the late Capt. Alfred Glascock, M. C., U. S. A., who cultivated his friendship, made him feel that he was worth while and encouraged him to learn to read and write. He was discharged with an apparently practical attitude toward his affective needs and the American environment.

CASE T (illustration V) is a typical *simulation* of the "perfect" man. He has been *conditioned* since infancy to consecrate his life to please his father and mother, according to his preadolescent impressions of their ideals. He was named Grover Cleveland and his bodily and facial postural tensions reveal the crucifixial trend of his affective cravings. He felt unshakably that he was inspired by God to direct President Wilson how to save the world. This type of growth of hair and beard, and general postural tension is often found in homosexual erotics who have compulsions to become the love-object of virile men (directors, managers, superintendents, presidents, kings, etc.). During the psychoses in such men the autonomic cravings cause sensory disturbances, hallucinations and fancies of experiences even though they are terrified by them.

CASE U.—The conduct of patient was quite typical of the abandoned anal-autoerotic flight. With wild expression of delight the Costa Rican boy claimed to be God, father and the whole world in himself. Biologically this was true for, like the serpent with its tail in its mouth symbolizing the complete circle of life, this boy would push his thumb into his rectum and exultantly claim for himself omnipotence. (Compare this abandonment to the defense and terror of Case F.)

PSYCHOTHERAPEUTIC PRINCIPLES.

The different methods of solving the conflict between the wishes of the *ego* and the repressed conditioned segmental cravings may be grouped into two general systems. Both depend upon developing a *positive transference* between the patient and physician which in principle amounts to a profound *wish* to coöperate in order to bring about a comfortable, socially constructive readjustment of the affections.

The *suggestion* method is to build up the powers of self-control through hygienic and physically reconstructive methods, withdrawal from causes of worry (family, business, responsibilities, etc.), diet,

exercises, hydrotherapy, mechanotherapy, electrotherapy, habit formation, and vigorous, well-placed suggestions. In cases of functional distortion due to repressed *fear*, as in the escape from causes of terror on the battlefield by becoming a suffering cripple unfit for duty but fit for sympathy, some patients are cured by making the treatment of the functional distortion more to be feared than the situation evaded, as in the method of *torpidage*. In similar cases recoveries are made by stimulating sufficient autonomic compensation of *hatred* which in turn will compel a counterattack upon and destruction of the fearful stimulus; as in appealing to the *love* of home and country to justify the war and arouse a compensatory compulsion to destroy the invader. Naturally the individual who feels he has been an unwelcome child and unfairly treated at home will not react with an enduring rage and indignation when the home is threatened through an attack upon the country. This type of man is not so well protected for enduring danger and privations as the man who feels that everything he loves has been violated. Hence, the large number of functional distortions as compensatory defenses against the cause of *fear* in the drafted American troops, many of whom did not feel compulsions to attack the enemy. This type of patient responds to the military surgeon who wins his confidence and affection and convinces him that the war is a most glorious, justifiable defense of all the sacred issues of humanity and that each soldier is an estimable part of the defense.

The men who do not feel deep hatred for the principles of the enemy are autonomically not as well fortified against the causes of *fear*, and are more likely to suffer from the shock of war because they are compelled by their own countrymen to endure it instead of being forced into battle by the autonomic compulsions of indignation and rage.

The *psychoanalytic* method of treatment is to develop a *transfer* and induce the individual to allow his repressions to cause him to become frankly aware of their interests. (This method of treatment is naturally opposed by men who can not endure becoming conscious of their own repressions and who feel that it is an indication of inferiority to make a repression; on the other hand, it is supported by men who have experienced the relief that is felt when the repressions are recalled.) Through allowing the repressed affections to have free play with the speech apparatus the repressed affect becomes assimilated by the *ego* by becoming an intimate part of it instead of an uncontrollable unconscious factor in the personality. In this manner the dissociated cravings that cause the obses-

sions, phobias, mannerisms, compulsions, delusions, hallucinations, regressions and eccentric compensations and prejudices are permitted to become an intimate part of the personality and the functional distortion disappears. The individual, having developed *insight and being free from fear* of something within himself becomes able to make a practical, common-sense adjustment.

Some psychoneurologists and behaviorists maintain that all psychotherapeutic methods are methods of *reëducation* in that they are readjustments of "*habits*"; considering the changing of *habits* to be *retraining* the reflex or systems of reflexes to react to normal instead of abnormal stimuli. If the term *habits* is used in this broad sense, applying to most of the integrative functions of the nervous system, *whether autonomic or proficient*, particularly the ontogenetic modifications of inherent integrations, the concept certainly covers all psychotherapeutic methods, and the concept of "training or reëducation" becomes loose enough to cover the effective readjustments following a psychoanalysis (the terms, however, then are as applicable to the intestinal readjustments following a saline catharsis). But this is about as enlightening as to say all literature is merely a matter of arranging the letters of the alphabet, or no matter what sort of building we build, we simply build out of the materials of the earth. The latter statement would have profound significance if the people believed that no house could be built without embodying a soul or spirit within it.

A sensible use of the reconstructive, suggestive method, following the psychoanalytic readjustment, seems to be most effective in giving the psychopath new interests for which to live and work without making eccentric compensations for prudish or fearful repressions, or yielding to perversely conditioned segmental cravings.

To know and master oneself (one's segmental reactive tendencies) is the most important and the most difficult thing in the world, but there is no alternative for the psychopath.

I wish to acknowledge the kindness of Dr. W. A. White, superintendent of St. Elizabeth's Hospital, for the permission to use the case illustrations.

PARANOID PSYCHOSES

A PROPOSED ADDITION TO SOUTHARD'S MAJOR PSYCHOTIC GROUPS

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The grouping of the mental disease entities into eleven primary categories, as proposed by Southard (1), is highly satisfactory from a pragmatic standpoint. It is very palpably superior to any more detailed subdivision, from the viewpoint of both student and teacher; easier for the one to present and define; easier for the other to grasp and correlate. It serves, moreover, as a neat and facile diagnostic index in which practically every psychiatric entity may be quickly placed.

From the standpoint of the practical psychiatrist, however, one possible alteration may be suggested, which would, without altering the principle of major categories, or that of diagnosis by orderly exclusion, materially augment the practical value of the Southard nosology. This is the insertion of a twelfth group, to be number IX, embracing paranoid psychoses, and possibly labelled *paranoicopsychoses*, or *paranoidoses*, which should include all idiopathic psychoses characterized by paranoid symptoms, including "*paranoid dementia præcox*."

That such a group is amply justified by clinical findings, in both a quantitative and qualitative sense, is not difficult of demonstration.

First of all it should be pointed out that in all of the eleven major groups of Southard's classification, there occur paranoid forms, or paranoid colorings. With these we are here not at all concerned. Thus we may exclude, *a priori*, such representative examples as the following:

In Group I, the neurosyphilis group, syphilitic paranoia should certainly remain. In Group II, the hypophrenias, the paranoid state dependent upon hypophrenic judgment defect are certainly properly retained. Similarly in Group III, the epileptics, with their proverbial ego-centricity and frequent paranoicism. Group IV, the drug

psychoses, contains the beautiful examples of drug-paranoias, *e. g.*, alcoholic Eifersuchtswahn, to mention only the most conspicuous.

The psychoses with focal brain disease (Group V) may be accompanied by striking paranoid symptoms, as was shown in a case reported by the writer (24), and Schuster has demonstrated the association of paranoid symptoms with variously situated brain tumors. Similarly, paranoid delusions with psychoses associated with somatic disease (Group VI) are frequently seen, and were conspicuous in the recent influenza epidemic (25). Of the gerio-psychoses (Group VII), senile paranoia or paranoid senile dementia is common enough. Group VIII, paranoid forms of the Schizophrenias, are discussed below. The cyclothymic psychoses (Group IX) are frequently strongly colored by paranoid trends, as are also the psychoneuroses (Group X). The paranoid constituents of Group XI, the psychopathies, etc., are discussed below.

But with all these we have here nothing to do. There remain yet many forms in which the elaboration of paranoid elements forms the characteristic and determining feature, and for which we have no satisfactory explanation.

In the first place, those two psychiatric cousins, paranoia (Kraepelin) and paraphrenia, are at present completely divorced in Southard's scheme, and the one added to the schizophrenic group, while the other is relegated of necessity to the group (XI) of psychopathies and miscellaneous psychoses. Waiving for the present the question as to the deserts of these diseases from the standpoint of basal symptoms in abnormal psychology, and as to the justifiability of losing so frequent and so characteristic a psychosis as paranoia in a group of miscellanies, or so dubiously schizophrenic a disease as paraphrenia in a group characterized by that phenomenon, we pass on to other closely allied forms.

Above all stand a group of "Unclassified paranoid psychoses" or "Unclassified paranoic states." The great frequency with which this diagnosis is made in a rapidly turning psychiatric clinic is surely a most striking fact. To those whose associations are stimulated by statistics, it will emphasize this fact to know that according to Pollock's census of the New York state hospitals in July, 1917, there were therein:

" Psychoneurosis	150
" General Paresis	1,325
" Manic depressive insanity	2,408
" PARANOIC CONDITIONS AND PARANOIAS	1,642
" (or 4.7 per cent. of the total number of insane, 35,000 +)."	

Add to this, possibly,

" Allied to dementia præcox, 1,233."

These cases, as they are seen at the Boston Psychopathic Hospital, for example, Dr. Southard's own institution, do not correspond to classical paranoia, neither to paraphrenia, nor by any means to paranoid schizophrenia (*dementia præcox*). Indeed, a certain large proportion of them fall in a group which surely merits special study. I refer to those cases of psychosis developing in the later years, often soon after the menopause, and characterized by persecutory delusions or persecutory (sic!) phonemata, or both—but always without demonstrable damage to the personality, or evident schizophrenia.

The writer falls in strongly with the view of Seelert (2), who in a study of "paranoid psychoses in advanced years" concludes that these more or less uniform cases probably comprise a distinct and unnamed syndrome, which is "probably an individual reaction of an endogenous sort to a chronic, slowly progressive, organic cerebral process."

Perhaps they should even be considered in the light of a new entity—but be that as it may, it is without the province of this paper. That they exist is not to be doubted, and as demonstrated they occur in surprising numbers. And as the Southard grouping now stands, these more or less uniform cases of committable psychoses of striking stamp must be crushed into the composite group of psychopathies, with committable and noncommittable entities of divers sorts.

Add to this list, then, those quasi-normal persons of paranoid personality—the querulants, litigants, cranks, et al. These persons, as borderline cases, might be grouped with great pragmatic advantage in an order of paranoid psychoses, and regarded as definitely psychotic, rather than merely (!) psychopathic—even though they be not committable.

Again, one recalls those rather hazy and infrequent entities, insisted upon by one or another European psychiatrist, and clung to tenaciously by this or that American devotee. Here, to list but a few, one would include: Wernicke's (3) *Hallucinoze*, Kraepelin's (4) *Eifersuchtswahn* (non-alcoholic), Kraepelin's (4) *Beeinträchtigungswahn*, Ziehen's (5) *hallucinatory paranoia*, French writers' (6) *delire paranoïaque* and *delire systematisé*, Sander's (7) *original paranoia*, Kleist's (8) *involutional paranoia*, Westphal's (9) *acute paranoia*, *periodic paranoia*, Laseque's (10) *folie de persecuteurs persecutés*, Falret's (?) (11) *folie lucide*, *raisonnante*, French (13) *delire systematisé*, Magnan's (12) *delire chronique à évolution systematique*, Regis' (13) *psychose systematisée progressive*, Se-

rieux's (14) *delire d'interpretation*, *delire de revendication*, Dupre's (15) *delire d'imagination*, Neisser's (16) *confabulatory paranoia*. (Among these, of course, one must allow for many synonyms.)

Finally, I propose the possible advantage of a separation of the so-called "paranoid form of dementia præcox," or "dementia paranoides" or "schizophrenia paranoides" from the main group representing schistic psychoses, and its identification with this new group of paranoid psychoses.

I shall not recall here the historical development of the presently composed dementia præcox, nor more than mention the doubts expressed by Seglas (21), Serieux, Bleuler (22), and even Kraepelin, as to whether this form would eventually stand affirmed as identical in essential nature with hebephrenia and catatonia.

The word "paranoid" seems to have been coined by Kraepelin to describe cases resembling but distinct from paranoia. This term, in turn, was introduced by Snell (17) and Griesinger (18), and originally meant merely "delusions." Kraepelin gives Kahlbaum (19), and then Krafft-Ebing and Mendel the credit for substituting the word for the older conception of *Verruechtheit*. Later, under the influence of Ziehen (5) et al., it came to include hallucinations and was finally whipped into the stereotyped, standardized form now recognized by Kraepelin.

The derivative word "paranoid" has never been rigidly enough delimited. Following Kraepelin, because of his influence in promulgating the term, it probably should be restricted to symptoms of the nature of "delusions and hallucinations of a persecutory bearing, and rapid development, be they changing, dissociated or fully developed" (4).

The writer would propose a more generic definition for the reason that the above does not sufficiently succinctly include the very closely allied symptoms of delusions of reference, delusions of influence, etc.

Southard (20) has divided delusions into two classes—those expressing a degenerate wish and those expressing a degenerate hypothesis. I have elsewhere (23) proposed that the idea is perhaps more readily grasped if the conception of direction is introduced, and the delusions termed afferent and efferent, with respect to the ego and its environment, or ego-centripetal and ego-centrifugal. Thus, the ego-centripetal delusions, or erroneous ideas conceived as originating from without the limits of reasonable possibilities, represent delusions of persecution, influence, reference, molestation, etc.—or expressions of degenerate hypotheses. I have

also suggested that hallucinations might be similarly regarded. Now it appears that this type of delusions and hallucinations is precisely what is intimated in general in the current use of the word "paranoid." At any rate it would be of immense pragmatic value in the teaching of psychiatry and hence in mental hygiene, if we would make some such specific definition of so important a term. The proposed limitation of "paranoid" symptoms to afferent or ego-centripetal delusions or hallucinations (or both) and with or without systematization, grandiosity, etc., has certain inherent commendations.

Accepting, however, for the present, Kraepelin's ill-defined conception of paranoid, it appears that his "paranoid dementia præcox" is precisely this symptomatology plus the factor of progress to a terminal dementia. As a matter of fact, however, we do not know that any considerable proportion of what we are calling paranoid dementia præcox actually does progress to a terminal dementia. This is a matter which will soon be conclusively demonstrated either in the affirmative or negative, now that the Kraepelin conception is growing to an age beyond that of the average state hospital case.

We do know, even at present, that at least some of these cases show no demonstrable evidence of dementia even after years of observation. Southard's insistence on the extirpation of the term "dementia præcox" as of pragmatic value in mental hygiene is then here directly to the point. It were better to give these cases the benefit of a doubt than to condemn them to a pessimistic diagnosis of implied hopelessness. Every psychiatrist must be occasionally overwhelmed with the utter lack of similarity in the cross-section view of cases of so-called "paranoid" and "catatonic" schizophrenia. If, then, the terminal, and supposedly criterion state is in doubt we are the more justified in at least a tentative divorce. This is in addition to and without reference to the historical arguments in favor thereof.

CONCLUSION

But whether or not this group be included, perhaps now the point is self-supporting—that there are paranoid states, *i.e.*, psychoses characterized by afferent type of delusions, which are not well placed in Southard's otherwise efficient and practical major group nosology. These, it is proposed, might be bunched as a twelfth group—the paranoicopsychoses, or paranoidoses, possibly to stand ninth in the list, and to include those mental disease forms, characterized by paranoid (*i.e.*, afferent) delusions, with or without

hallucinations, not otherwise provided for in this inclusive classification. Herein would fall such currently recognized entities as paranoia, paraphrenia (and Magnan's disease), paranoid personalities (to be considered before the more generic and more tenuous psychopathy group), together with the unclassified paranoid states, the unclassified paranoid psychoses, numerous entities described by various European psychiatrists listed above; and finally, with probable pragmatic benefit, the paranoid form of schizophrenia.

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DILATATION OF THE LATERAL VENTRICLES AS A COMMON BRAIN LESION IN EPILEPSY¹

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Dilatation of the lateral ventricles has always impressed me as being a very common abnormality of the brains in epileptic subjects, and although for a long time it has been well known that convulsions were frequently associated with internal hydrocephalus, especially in those early cases where the dilatation began before cranial synostosis had been completed, I have failed to find ventricular enlargement mentioned in the literature as a common finding in the pathology of epilepsy.

Until recently I have had to content myself with the impressionistic idea relating to dilated ventricles, as many of the brains removed at the Monson State Hospital were preserved entire for photographic work and numerous brains have been sent to the neuropathological department of the Harvard Medical School for total brain sections and intensive study. Therefore, it has been necessary to wait until a sufficient number of consecutive autopsies have been performed before beginning this study.

Since January, 1913, I have collected from my autopsy material the brains of 75 epileptic subjects, the results of 82 consecutive post-mortem examinations, and it is upon a personal analysis of this material that the statistics here presented are founded.

Fifty-seven, or 76 per cent., of this group presented gross brain lesions. This is 13 per cent. higher than was reported in a previous paper ("No. 1, An Anatomical Search for Idiopathic Epilepsy"), but this higher percentage of grossly abnormal brains may be accounted for by more thorough dissection in the search for dilated ventricles. Thirty-one of these 57 cases presented cortical lesions as well as dilated ventricles; 16 showed lesions of the cortex alone, while the remaining 14, with a normal looking cortex, had dilated lateral ventricles.

Of the entire 43 cases revealing cortical lesions, the hind portion of the brain was by far the most frequently affected, especially the

¹ From the laboratory of the Monson State Hospital.

occipital lobes. The convolutional shrinkage in this region was often marked, and the appearance was that of an acquired condition rather than one of congenital origin. Next in order of frequency was the general cerebral gliosis where the entire cerebrum appeared to be involved. Softenings were noted only six times, once being general, the other five times being focalized. ("No. 1, An Anatomical Search for Idiopathic Epilepsy." Thom and Southard, Review of Neurology and Psychiatry, October, 1915.) The rarity of soft brains was rather surprising when one considers that there were 29 cases of well-defined sclerosis of the basilar and cerebral vessels; also, one would expect to find cerebral hemorrhage frequent with these weakened vessels and high blood pressure, but in only two of the 75 cases was there evidence of arterial rupture. Gliosis and atrophy of one hemisphere alone was noted in 8 cases, equally divided between the two hemispheres.

The dilated ventricle group, comprising a total of 41 cases, or 54.6 per cent., would form the basis for a very interesting study. Twenty-seven of the brains in this group also had abnormalities of the cortex, which for the moment will be given preference over the dilated ventricles, as being the more likely pathological lesion of which the convulsions are symptomatic. The residue of 14 cases with dilated ventricles, where the cortex of the brain was not grossly abnormal, but where the ventricular dilation was of such a degree as to leave no doubt of its abnormality, raises the question as to whether lesions affecting primarily the white matter may not be a factor in the production of epilepsy.

Perhaps there is no field in neuropathology which is so rich in gross pathological brain changes as that of epilepsy. Like the manifestations of the disease itself, the lesions are often of a spectacular character, yet it is most difficult to state whether these lesions are the cause or effect of the convulsions, or whether they are in any way correlatable with the epilepsy.

I hope to be able in the near future to make some attempt at separating the "problematical cause lesions" from those that have been produced directly and indirectly by the disease itself, and then set aside a third group of lesions which, to my mind, are not related to the epilepsy in any way. This will necessitate a careful study of the case histories and intensive microscopical research.

The tables presented below show the age at onset of the convulsions in two groups of dilated ventricle cases, the first, Table A, the 27 cases with dilated ventricles and cortical lesions; the other, Table B, the 14 cases with dilated ventricles without cortical lesions.

TABLE A.—AGE OF ONSET, FIRST CONVULSION

Congenital cases	2
Between 1 and 5 years	6
Between 5 and 10 years	3
Between 10 and 20 years	6
Between 20 and 30 years	2
Between 30 and 40 years	1
Between 40 and 50 years	5
Between 50 and 60 years	1
Over 60 years	—
Unknown	1
	<hr/> 27

TABLE B.—AGE OF ONSET, FIRST CONVULSION

Congenital cases	1
Between 1 and 5 years	2
Between 5 and 10 years	—
Between 10 and 20 years	3
Between 20 and 30 years	—
Between 30 and 40 years	2
Between 40 and 50 years	3
Between 50 and 60 years	2
Over 60 years	1
	<hr/> 14

No doubt there would be something gained from an intensive study of these two groups of cases. The congenital and acquired lesions might be separated with some degree of accuracy, and more important yet is the character and location of lesions capable of producing convulsions as compared with those pathological changes produced by convulsions. I am not as yet willing to accept the theory of Gowers, who believes that "Lesions of the cortex alone are capable of producing convulsions." Lesions of the cortex, associated with congenital internal hydrocephalus, no doubt are often secondary, while many of the cases of ventricular distention are acquired rather than congenital defects, and cannot be attributed as the causative factor in the production of convulsions.

Of the 27 cases which belong to the group having both dilated ventricles and cortical lesions it will be noted that 17, or 63 per cent., had their onset before twenty years of age, as compared with 6 cases, or 43 per cent., of Table B, where there were no cortical lesions.

Excluding the alcoholic and syphilitic cases, the onset of convulsions after thirty years of age is not common. Here we find that 57 per cent. of the cases with epilepsy and dilated ventricles (no other gross lesion being present) have their onset after thirty years of age; there is just a suggestion here that if lesions other than those of the cortex are capable of producing convulsions, the nature of the pathological process is slow and the onset of the convulsions late.

Further speculation without intensive study would be fruitless. In closing, I would call attention to the frequency of ventricular dilatation in this series of epileptic brains,—that in 14 of these cases there was no other gross lesion present, although 76 per cent. of the entire group presented some gross lesion at autopsy. These lesions do not in all cases represent the cause of the epilepsy, and by further study they might be placed in one of three groups:

1. Those lesions to which the epilepsy might reasonably be attributed.

2. Those lesions which might reasonably be explained by the epilepsy.

3. Those lesions which are neither the cause nor results of epilepsy.

Society Proceedings

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING, MAY 15, 1919

DR. GEORGE A. WATERMAN, President, in the Chair

AMERICAN EXPEDITIONARY FORCE EXPERIENCES

The meeting was given to informal reports of experiences in service in France given by those members who had participated in such service.

DR. WILLIAM JASON MIXTER said that he had been detailed to work in England which had proved mostly of a non-neurologic character. His work had been that of providing for troops passing through England on their way to France and providing for wounded Americans returning to England. His main task with the men passing to the front was to keep them in as good physical condition as possible, removing any ill effects of the voyage and send them on across, and which was accomplished through rest camps, aviation camps, base hospitals and at embarkation, all of which came under his charge. Dr. Mixter's duty to the wounded was largely that of organizing their distribution to the hospitals all over England, which resulted finally in the establishment and occupation of 12,000 beds for Americans besides 5,000 more Americans in English hospitals.

DR. ARTHUR H. RUGGLES reported a case and discussed the pernicious use of the word shell shock which covered but did not explain any variety of neurotic disturbance and was used by the men themselves as a covering term which preconceived disability and excuse for perhaps any misdemeanor or inability. He led to this by the discussion of a case of a British officer seen in a British hospital who was afflicted with a remarkable gait and tremor and passed through the most extraordinary contortions when he attempted to walk. At first he was quite uncommunicative and had resisted all forms of treatment. His recovery followed upon a final disclosure of his history with an explanation on the part of the physicians of the mechanisms by which he had converted his personal difficulties into the neurotic disturbance.

His past life had been that of a gentleman of leisure. Here he had manifested in hunting a peculiar aversion to a dead animal and the sight of its blood. He had hesitated over enlistment ostensibly because of his

wife's approaching confinement. When this was over he left for the war, but still in evident conflict. His dread of a dead person and of killing haunted him though he tried to accustom himself to these things. He could not sleep and continued much disturbed about his doing his duty as a soldier. He was pursued by frightful dreams. On visiting his superior officer in a hospital in the rear he was much impressed by the comfort of the wounded man. It was then that he decided that he could not go back to the front and tried in several ways to take his life, but without success. He was taken to a hospital where the tremor and gait were developed.

Dr. Ruggles reported also the case of a sergeant who had his eyes treated for several weeks following an impairment of vision through the splashing of lime into his eyes at the explosion of a shell. He worried over his eyes and then fell into difficulties over a misunderstanding with a French woman whom he was to have married. She accused him of trying to desert her and brought suit which caused his arrest and confinement in the guardhouse. He had had no black mark against him for nine years and on the ninth day in the guardhouse developed complete blindness. At the hospital to which he was sent his blindness was discovered to be hysterical and he recovered in one sitting.

An artillery officer, also reported, had wished to be transferred to air service, but though his artillery record was a good one he did not do well in the flying service. As a child a good deal had been said to him about growing pains and his legs had always been points of least resistance. An attack of influenza during service had caused him a good deal of pain in the legs. When he went back to service he found his legs had become a serious hindrance in performing his duties and he feared he was a failure in the air service. After the armistice he still continued his training, but feared he was of no use and would just kill himself at his work. He finally developed a paralysis in both legs and with severe pain. After being in bed for four months he was at last seen as a functional case and cured in one sitting. He returned to duty, but in his old organization with which he returned home.

The types of neuroses to which Dr. Ruggles chiefly referred in this report were the conversion neuroses or "conversion hysteria" or "hysteria" with a broad connotation. He too testifies that anxiety states are more frequent with the officers, while the conversion hysteria is more common with the enlisted men. These cases the British treat by suggestion, reëducation and persuasion. Under the direction of Colonel Hurst, under whom he worked, the speaker has largely developed treatment by persuasion by going over with the patient the mechanisms and causative factors involved in the case and persuading the patient to make use of the functionally disturbed part. He does not even believe in a careful preliminary neurologic examination, believing that the patient has had enough of this, and that the knowledge of an organic lesion diverts attention from the purely functional side. He reserves the

examination to a possible residue after treatment has been pressed on the functional side. This the speaker considered a mistake, believing the thorough examination is a part of the logical attitude which the patients are encouraged to take and assures them that the matter is thoroughly and intelligently handled. These are cases which the French have treated largely by suggestion, suggestion combined with electricity and later suggestion and persuasion combined. Dr. Ruggles believes that electrical treatment is prone to convince the patient of a serious condition where the explanation and persuasion put him in a much clearer and more reasonable attitude toward the difficulty.

Dr. Ruggles stated in answer to a question by Dr. Stedman that in most cases there was not time for detailed psychoanalysis although complexes were evident. Most men thought they obtained as good results by the question and answer method.

DR. THOM said that he had never seen a case of hysteria in an officer in England, but in his experience at the American Base Hospital No. 117 there were as many hysterical conditions among the officers as among the men. Deafness, aphonia, paralysis and blindness were its manifestations.

DR. A. WARREN STEARNS gave a report of his experience in classifying men as to fitness in his service in establishing a psychiatric department in the Naval Training Station on the Pacific coast. He believed there were four fundamental factors to be considered: (1) Physical condition; (2) capacity evidenced by psychological tests; (3) formal education; (4) industrial capacity. The initial observations were made on the basis of appearance, geographical location, relation between home and place of enlistment and previous wanderings, formal education, occupation and general health. Looking at the recruits in this way he divided them into three groups, those plainly unfit, those obviously well and a middle group held for further examination. Mental defect was considered to be ruled out if there were eighth-grade education, abnormal personality and congenital conditions, such as epilepsy, if there were high-school career. Mental disease was believed ruled out if there were industrial deficiency. Owing to the necessarily brief time allotted to the interviews, it was believed that this social classification was the more practical. The facts gathered from the industrial history as well as those obtained by group tests made valuable material for selecting men for special work. A simple numerical index was worked out whereby his capacity and training can be made a matter of easy reference.

DR. DOUGLAS A. THOM spoke of the British pension system which he had been sent to study. He found that under the attempt to get the men from the hospitals, either back into service or out of the army, a vast number of perfectly curable cases among the functionally neurotic patients were sent back and discharged uncured. They were referred to the Pension Board where the amount of the pension was passed

upon with insufficient examination of the case. The result has been that there are about 20,000 functional hysterical patients in England to-day.

The men spent their pensions soon, often they were inadequate, especially where there were families, and the pension is cut down as the disability gradually grows less. All this gives too ready opportunity for dissatisfaction. There is no way of holding the pensioner to treatment, and there are many who will not go to hospitals for treatment, while other cases are being cured in one or two sittings. Also there has always been the difficulty that there was not hospital provision enough in England for these pensioners, so that many had no place to go for treatment.

Dr. Thom spoke of the cases of convulsions he had seen. No certain case of epileptic convulsions had come under his observation where the convulsions had been produced by the war. He mentions the association of hysterical with epileptic convulsions and questions whether many of the reported successfully treated cases of epilepsy may not rather have been of hysterical convulsions, cases at least in which there was a large element of hysteria.

He summarizes the lessons learned by his commission to England by saying that he believed no person should be discharged from the army with any curable hysterical symptoms. No one should be discharged from the army as an epileptic until without the sanction of a competent neurologist. All cases of concussion and shell shock are amenable to treatment and should therefore be given such treatment. There should be special hospitals with specially trained staffs for the neuroses. The gratuity system of England he condemns as unsatisfactory and should not be in force in America. At present we have the same difficulty in enforcing treatment upon a discharged man. He warned our country against repeating England's experience in allowing sentiment of families to interfere with the placing of insane soldiers in institutions where they could be cared and treated.

DR. JOHN J. THOMAS spoke of the difficulty of handling neuroses satisfactorily in the case of patients whose illness promised a long duration. These had to be sent home owing to limited hospital accommodations. Nevertheless the establishment of Base Hospital No. 117 and several others nearer the front made it possible to treat many functional cases and get them well in a short time without sending them back to the Base Hospital. The military discipline is an excellent aid in producing this quick recovery. Among the cases which were more severe and were treated at the Base Hospital many were returned also to service.

Dr. Thomas would not lay stress upon the concussion syndrome as the French do. He believed the cases he saw were pure neuroses. There were cases of melancholia due to fatigue and exhaustion which manifested mental paretic signs but with no positive laboratory or physical signs. He believes that many men were admitted to service with mental defects in spite of the careful psychiatric examining work done.

Wounds of the head seemed more frequent earlier than later in the war, probably because of the use of the steel helmet. Head injuries did well, but spinal injuries were discouraging. This he ascribes to the high velocity of bullets at the present time. These cases were often fatal. Paralysis developed in about thirty per cent. of wounded extremities. Peripheral nerve injuries could be treated with difficulty because of the lack of bed accommodation and the distance from home. Those which had to be left for secondary operation at home stood less chance of recovery.

PHILADELPHIA PSYCHIATRIC SOCIETY

REGULAR MEETING, MAY 9, 1919

CHARLES S. POTTS, M.D., Presiding

DRUG TOXEMIAS, THEIR NATURE, ETIOLOGY AND SYMPTOMATOLOGY

DR. JOSEPH O. DOANE spoke against the sensationally disseminated misconceptions in regard to drug taking was rather one of the symptoms of an underlying physical, mental or moral abnormality, this particular form of manifestation depending upon some more or less accidental factors. These might be the example or advice of others, including physicians' prescriptions, the seeking of relief from pain, long-continued medication with some unknown drug, all of which become then also predisposing factors in receptivity toward the drug. Decreasing earning power is an added link between drug taking and crime.

Cures the speaker believed are few and relapses are the rule. Temporary relief is often obtained. Drug addicts are subject to diseases which solve their problems by death.

THE TREATMENT OF DRUG NARCOTIC ADDICTION

DR. JOSEPH McIVER discussed in a general way the treatment of drug addicts. He emphasized the need of a flexible scheme which gave ample room for individual differences of need and response. The history of the taking of the drug and a complete physical examination are necessary. The essential factors in treatment are gradual withdrawal with free purgation, based upon the principle that there was an actual antidotal toxic substance in the blood. Then there should be sedatives or stimulants as required and the elimination should be followed by sufficient rest, the administration of tonics and a liberal diet to repair the patient's weakened condition. The diet during treatment should be simple and nutritious.

Dr. McIver called attention to the greater need but also greater difficulty of building up a mental and moral background for future resistance, but offered no suggestions in regard to reaching this side of the patient's difficulty either in regard to discovery of the etiology of the drug taking or its future prevention.

FEDERAL AND STATE LAWS IN RELATION TO THE DRUG HABIT

DR. JOHN H. W. RHEIN reviewed the various efforts which have been made to restrict legally the sale and use of narcotic drugs. The first of these was an edict against the smoking of opium issued in China in 1729. In 1906 another such edict was issued in China against the use of opium and the cultivation of the poppy, and in 1909 an international conference was held at Shanghai to regulate the importation and exportation of habit-forming drugs and restrict their use to medicine only.

No law was passed in the United States until the Harrison law in 1914, which was supplemented by the Pennsylvania law three years later. Recently the federal law has been amended. Its purpose is so to regulate the sale of such drugs that they might be in the hands of ethical doctors and pharmacists only, but until recently the law had been but little effective against venders. The law that drugs could be dispensed only on an order written on a form provided by the commissioner of internal revenue, or on a physician's prescription, and forbidding a physician to prescribe for an addict except in curative treatment has been evaded or it has been circumvented by the enormously large amounts prescribed by the physician. Physicians have often committed this error technically, merely from ignorance of the law.

The drug habit, the speaker said, is so bound up with the character of the individual and hence with delinquency and crime that it is a social evil involving the problem of the reform of the individual. The laws cannot be enforced as long as the supply from manufacturers is not restricted nor with the present insufficient personnel for enforcement.

DR. F. H. BALDI, in the discussion of Dr. Rhein's paper, compared the extent of the drug evil here with that in London and Paris. There the situation was inconceivably worse. He too emphasized the need of control of production and believed in education in regard to the evil as of service where legislation fails.

As to treatment he believed in quick and absolute withdrawal of the drug. He recognized certain essential factors in treatment. These were isolation; absolute control of the patient; deprivation of the drug without substitute of any narcotic; thorough elimination by bowels, kidneys and skin; rest, nourishment and work.

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Atwell, W. J. ON THE USE OF THE TERM "SYMPATHETIC NERVOUS SYSTEM." [Anat. Rec., May, 1919, 16, No. 3, p. 138.]

It is held by the writer that the term "sympathetic nervous system," if it is to be retained in neurological nomenclature, should be used in the broadest possible sense—to denote that part of the peripheral nervous system which is concerned with the innervation of smooth muscle, cardiac muscle and glands. The term should include both afferent and efferent nerves and in the efferent chain both preganglionic and postganglionic neurones, and of the preganglionic those that leave in the craniosacral outflow as well as those in the thoracolumbar. "Autonomic nervous system" should be used synonymously with "sympathetic nervous system," or at least be applied to the entire efferent portion of the system. The application of "sympathetic" and "autonomic" to restricted portions of the efferent system, as has been done by Langley and by the German school, respectively, is to be deprecated from a morphological viewpoint. If "sympathetic" is to be employed in this broad sense it will be found desirable to adopt simpler terms to replace the rather awkward compounds "craniosacral component" and "thoracolumbar component." The adoption of such new terms should come only after a conference of anatomists, physiologists, pharmacologists and clinical neurologists. [Author's Abstract.]

Brown, W. Langdon. SYMPATHETIC NERVOUS SYSTEM. [Lancet, May 31, 1919, Med Rec.]

In this third Croonian lecture on the rôle of the sympathetic nervous system in disease the author discusses the question of the relationship of the blood sugar to glycosuria and the influence of the sympathetic and endocrine glands upon them. He points out that diabetes should be considered a disease of metabolism as a whole, although the carbohydrate disturbance probably precedes the others. He takes Allen's slight modification of Pollack's classification of glycosurias as a basis for discussion, namely: A. Glycosuria resulting from renal action: (a) without hyperglycemia, *e.g.*, phloridzin poisoning; (b) with hyperglycemia, renal poisons, *e.g.*, uranium. B. Glycosuria resulting from hyperglycemia: (a)

independent of glycogen content of the organs—diabetes; (b) dependent on glycogen content of the organ and caused by sympathetic stimulation—(1) central (analogous to puncture of the fourth ventricle), caffeine, strychnine, asphyxia, and stimulation of sensory nerves; (2) peripheral, adrenalin. As suggested in this classification, renal lesions may lead to either increased or decreased permeability of the kidney to sugar and it is probable that remedies such as uranium, employed to diminish glycosuria, really do so by damaging the kidney. There is also a condition of hypoglycemia with glycosuria, to which Salamon gave the name “diabetes innocens.” Such cases, however, must not be looked upon as necessarily non-progressive, as some undoubtedly do pass into typical diabetes. Allen considers diabetes as a definite entity sharply contrasted with all other forms of glycosuria, and defines diabetes mellitus as the condition resulting from the reduction of the pancreatic amboceptor below the requirements of normal metabolism, basing this mainly on the anti-diuretic effect of parenterally administered dextrose and its paradoxical law of its assimilation in the non-diabetic, even though glycosuric, organism as opposed to the diabetic. After discussing in some detail the rôle of the pancreas in the production of diabetes, the author points out that over-secretion of the pituitary gland always lowers the tolerance for sugar and may excite a frank glycosuria, or the sympathetic nervous system may produce glycosuria through stimulation of the pituitary, as was shown by Weed, Cushing, and Jacobson. Thyroid extract is also known to excite glycosuria, and this condition in pregnancy is probably due to the stimulating effect of pregnancy on the thyroid and the pituitary. There is also experimental evidence that glycosuria can be excited by excess of adrenalin, although there is very little clinical evidence of a definite adrenal diabetes. It may be concluded that underaction of the pancreas or overaction of the adrenal, thyroid, or pituitary can all lead to glycosuria. But if there is no disease in any one gland the question arises as to how the loss of balance is brought about. The author calls attention to the way in which this could take place through the sympathetic, stimulation of which increases blood sugar as a defensive measure, causes increased secretion of adrenals, thyroid, and pituitary and in its general effect is katabolic. By increasing the secretion of glands which diminish carbohydrate tolerance and inhibiting the gland which increases this tolerance, the sympathetic raises the blood sugar above the leak point and this results in glycosuria. Brown suggests that the failure of the carbohydrate of the food to be assimilated owing to defective action of the internal pancreatic secretion would produce far more profound disturbance of metabolism than the increased action of glands which simply increase the sugar mobilization, because the action of the latter would be limited to that on the stored carbohydrate in the body, which does not reach a large amount. This accords with the fact that pituitary and thyroid glycosuria are more amenable than the glycosuria dependent upon

frank pancreatic disease, and explains why spontaneous diabetes resembles pancreatic diabetes more closely than the glycosuria arising from any other endocrine gland. Yet Allen says the diabetic may have as good a pancreas as any one else. Allen suggests the following as the most reasonable classification of persistent glycosuria: (1) *Organic origin*, with structural changes in the endocrine glands leading to (a) overaction of adrenal, thyroid, pituitary, or (b) underaction of pancreas. (2) *Sympathetic origin*, with no evidence of structural changes in any endocrine gland, but producing a functional (a) overaction of adrenal, thyroid, pituitary; and (b) underaction of pancreas. This really makes spontaneous diabetes a disease of the nervous system, which the author points out is not a new idea. The author's final conclusion is that diabetes is due to deficiency of the pancreatic amboceptor, which deficiency may be due to structural changes in the pancreas, or to inhibitory action of the sympathetic on its internal secretion, an effect which may be aggravated by sympathetic stimulation of other endocrine glands, thus further diminishing the power of carbohydrate assimilation.

Girou, E. CAUSALGIA AND THE VEGETATIVE ARC. [Presse Méd., Nov. 14, 1918.]

The author here discusses the pain due to lesions involving the vegetative fibers as contrasted with the pains due to implication of the sensory nerves of the sensori-motor arc, a distinction too little entertained even by professed students of neurology. In sensori-motor lesions paralysis, loss of power and pain occur. Lesions in the vegetative system are manifested by contracture, circulatory and trophic disturbances and pains, but the pain is of a different quality. With the Weir Mitchell type of causalgia the median or popliteal nerve was always found injured, rarely the vegetative nerves. The nerve over a stretch of up to 10 cm. was involved and R. D. was complete. Sicard accomplishes blocking with injection of alcohol. Girou by moderately ligating the nerve. The ligature on the median nerve is above the vegetative fibers coming from the humeral. He has been treating causalgia for three years by this method. With contracture of the hand, he found the peripheral arterial sympathetic sheath injured.

Addis, T., Shevky, A. E., and Bevier, G. THE KIDNEY, ADRENALIN AND PITUITRIN. [Amer. J. Physiol., 1918, 46, 129-46.]

Adrenalin and pituitrin have opposite effects on the renal activity as regards the function of excretion of urea. Adrenalin increases its activity, pituitrin decreases it in quite regular proportions. The authors hold that their results show that, together with the regulation of urea excretion through the urea concentration of the blood, there is an overruling regulation by the vegetative nervous system, which consists for the most part in control of the relative secretion from suprarenal and pituitary glands.

2. ENDOCRINOPATHIES.

Trautman, A. HYPOPHYSIS AND THYROIDECTOMY. [Frankfurter Studien f. Path., Bd. 14, No. 2.]

The hypophysis of the goat undergoes marked alterations after thyroidectomy. Not only the anterior lobes but also the intermediary lobes and brain are affected. The degree of specific change depends upon a multitude of factors (age of animal, presence of thyroid remains or glandulæ thyroideæ accessoriae, pregnancy, interval between operation and examination, etc.). The changes usually take place in the glia of the brain, the intensity of the process resulting from the extirpation of the thyroid gland accordingly increases in proportion to the time elapsed since the operation. Structural changes in the pituitary body should be considered degenerative processes. The occurrence of regressive development together with progressive development is a well-known phenomenon, since death and self-preservation are always associated. Theories of physiologic correlation to the effect that a blood-gland (the hypophysis in this case) may compensate for another gland (the thyroid) are totally unwarranted. The extirpation of the hypophysis, like the extirpation of the thyroid produces a condition in which vegetative functioning is decreased. The interrelation between thyroid and hypophysis seems to have been greatly overestimated. To accept the view of a vicarious relation between the assuming by the hypophysis of the functions of the inactive thyroid is not in accord with the results obtained in experimental use of extracts of the two glands. The writer also considers it incorrect to dwell upon the structural similarities of the hypophysis and thyroid, since they differ radically in structure. The method of secretion in the pituitary body seems to be entirely different from the thyroid also. For division of the pedicle of the hypophysis produces the same effect as extirpation of the pituitary body. If the hypophysis is to replace the thyroid this must hold not only for small animals where the thyroid approximates the hypophysis in weight and size, but must apply universally. This seems impossible in the goat. Even the suggestion that the greater the thyroid and the smaller the hypophysis, the greater the changes that occur in the latter because it cannot replace the thyroid, has no support. If, moreover, there were a compensatory connection between the two organs, and the hypophysis were able to substitute for the lost thyroid vicariously, there should be no painful disturbances or at most scarcely perceptible disturbances in the general health of the goat; but the opposite is the case. Not even a partial replacement is to be accepted. At the most one might suspect that the hypophysis together with thyroid tissue that has not been fully extirpated is sufficient to prevent painful after effects. But this is not the case either. The increase in weight of the pituitary body after thyroidectomy is a result that depends upon the peculiarity of the process. The increase in absolute weight may also be determined by pathologic

processes and need not necessarily be caused by a vicarious, compensatory hypertrophy. The changes occurring in the main cells after thyroidectomy should be considered degenerations after temporary increase of the cell bodies. The main cells are more quickly filled with granules than under normal conditions, whereupon the cell body undergoes a colloidal transformation. As a result of the extraordinary distention of the single cells in the cell series the requirement for nourishment often becomes unfavorable on account of the frequent thickness of the cords. This condition results in the disruption of the cells, starting with the decay of the nucleus of the cell body. This is not a fatty degeneration, but a resorptive process. In place of the cells connective tissue is found, accounted for by the cirrhotically altered portions of the gland-lobes attacked by this process. Karyokinetic constellations that might point to a compensatory hypertrophy were not found in these structures at all. The cells found by some writers on removal of other organs of internal secretion, which seemed to resemble the appearance after thyroidectomy indicate that the removal of other glands of internal secretion may have an effect upon the principal cells similar to that of removal of the thyroid. It is doubtful whether there is an increase in acidophil cells after thyroidectomy by mitosis. It would be safer to assume that the great wealth of acidophil cells in the gland-lobes of thyroidectomized goats were produced by the circumstances of the acidophil cells having been prevented in some way from liberating their secretion, and having thus, by producing granules of secretion been transformed into pale, almost colorless plasma, *i.e.*, main cells. The extensive migration of acidophil cells through the hypophyseal cavity and the intervening lobe and the formation of cysts with acidophil colloidal contents, should probably be ascribed to this circumstance also. The secretion of acidophil cells in thyroidectomized animals is found very rarely in the lumen of the blood vessels. The increased fat content of the acidophil cells in the surrounding portion and in the altered portions of tissue seems to be primarily an expression of diminishing vital cell-functioning and not a result of a secretion product. Phenomena, such as loose granulation, granular disintegration, etc., in acidophil cells, point to increased difficulties of existence and nourishment. The small proportion of basophil cells in the gland-lobes as compared with the acidophil cells is explained by the fact that the replacement of the latter by the main cells does not keep up with the transformation from basophil into acidophil cells, because main cells seem to react essentially as described. The irregular form of the vessel lumen is determined by the slight compression of the loose tissue as a direct result of blood pressure. The decay of the main cells and of whole lobes simplifies the bulging and increase of the vessel lumen. The interstitial blood content as well as the frequent hematoma formations owe their origin to this, because under these conditions rupture of the exceedingly thin vessel wall may easily occur. The multiplication of

goblet-cells and their active secretion in the epithelia of the hypophyseal cavity seems to be an indication of increased function as a result of thyroid extirpation. The secretion, singularly, remains in the cavity and thickens with constant disturbances of further secretory products to a bone-like hardness. The lumen of the cavity is thus naturally broadened. Since the number of goblet-cells is not evenly distributed over the whole epithelia of the cavity, a heaping of secretions occurs here and there that gives the cavity an irregularly bulging and deformed appearance. Under such conditions, thyroidectomy often results in postulous infragments of the cavity which may extend far into the glandular and intermediary lobes and even into the brain. Usually they are cut off from the cavity as cysts or (rarely) are connected with it by a narrow channel. In the cavity, the basophil content, reacting to mucus-colors, comes from the goblet-cells. It is mingled with the cavity epithelial cells, containing numerous granules and with the acidophil secretory masses given off by the immigrated acidophil cells. These secretory masses normally participate only to a small extent in the construction of the cavity content as soon as any secretory congestion occurs in old age through functional disturbance. The acidophil cells show signs of degeneration after giving off their secretion and develop pigment granules in the cell body. From these cells they travel singly and in groups through the intermediary lobe-like epithelium, constantly accumulating pigment and give rise to the pigment deposits in the brain. The ciliated epithelium certainly shares in the mixture and probably also in the movement of the numerous basophil and acidophil secretions in the cavity, secretions called colloidal on account of consistency and appearance, but which can probably not be identified with the colloid of the thyroid or with that of the gland, in view of their origin and constitution. The congestion of secretory masses in the cavity appears to attract the degenerated secretory masses from the hollow. A constant pressure is thus exerted on the cell body. Under these circumstances injury to the cell elements must result. The changes taking place after the thyroid extirpation in the glia of the grain seem to consist in part of a reduction of the plasma of the glia cells. The glious tissue situated in the connective tissue mass also becomes more loosely knit, and porous, because the secretion of the cell lobe is greatly decreased. With the decrease or cessation of the secretion of the degenerated intermediary lobe cells for other reasons, the lymph spaces stand out distinctly. In the neurohypophysis the glia does not show supporting functions on account of the failure of nervous organs, but has phagocytic and locomotor peculiarities that are perhaps directly related to the secretion of the intermediary lobes. By reason of the scanty production of the latter in the brain, phenomena appear that condition functional activity on the part of the glia and concomitant degenerative processes. The small size of the brain portion favors this. The occurrence of massive connective tis-

sue may be explained by the fact that this appears instead of destroyed glia cells and glia fibers. There is a causal connection between the large pigment deposits in the brain after thyroidectomy and the acidophil cells immigrating to it from the gland lobes via the cavity and the intermediary lobe, by reason of their quantitative, qualitative and spatial relation. The cysts with colloidal contents in the gland lobes consist of solid cell cords. These cysts owe their origin to secretory congestion and the decay of functionally exhausted cells. It is obvious that the cysts, which are often large, may be dangerous, on account of pressure. The epithelium of such cysts may also disintegrate, thus setting the products contained in them free in the interstices, where it is probably largely absorbed, but may also calcinate. No results were obtained from experiments on the hypophysis pharyngea, since it was not found in the goat.

From the alterations that the hypophysis undergoes after extirpation of the thyroid, he concludes that there is an intimate physiologic relation between the two organs. The total or partial default of the thyroid function apparently conditions morbid changes in the blood which have an injurious effect upon individual portions of the hypophysis. The changes are chiefly degenerative. There can be no question of a vicarious substitution of the hypophysis for the extirpated thyroid. The fact that all parts of the hypophysis share in the changes lead to the conclusion that in none of these have we an insignificant rudiment, but that all parts are essential and of like importance for the combined functioning of the hypophysis, and there is apparently close interrelation. [S. E. J.]

II. SENSORI-MOTOR NEUROLOGY.

3. MENINGES.

Weed, Wegeforth, Ayer and Felton. MENINGITIS. [J. A. M. A., Jan. 18, 1919.]

A preliminary note reporting observations made in the study of meningitis at the Army Neurosurgical Laboratory in Baltimore, by these authors. In their experimental study they found that a certain strain of *B. mucosus-capsulatus* was especially virulent in laboratory animals, producing a typical and fatal leptomeningitis. This particular strain is, according to Perkins' classification, the *B. lactisaërogenes*, differentiated from other members of the group by the sugar reactions. It is an encapsulated, nonspore-forming, gram-negative, nonmotile bacillus, tending to occur in chains of various lengths. It was isolated from the lungs and blood of a patient dead from bronchopneumonia. Later experiments with the intravenous injection of this organism in doses of 0.5 to 1 c.c. of a twenty-four-hour broth culture in cats caused no symptoms but, in one instance, cerebrospinal fluid was removed by puncture and the animal showed signs the next day of meningeal irrita-

tion, and a second puncture with withdrawal of fluid was done. The fluid drawn was definitely turbid, contained 5,800 white blood cells, and gave positive culture of *B. mucosus capsulatus*. The animal died in twenty-eight hours, and the necropsy revealed a typical exudative leptomeningitis. Other cats were immediately tested by withdrawal of spinal fluid and similar conditions followed, while the control animals, without withdrawal, remained normal after a double intravenous dose. The release of cerebrospinal fluid in these other experiments showed that it may be made at either extremity of the spinal canal; and the procedure brought out the same results in rabbits, white rats and monkeys. The time relations are important. In no case has meningitis followed when the cerebrospinal fluid was released thirty or more minutes before the inoculation, but it appeared if it was withdrawn a few minutes after or before the inoculation. During the height of a suitable artificial septicemia, the release of fluid invariably causes a meningitis. It must be assumed from their findings that blood becomes sterile in twenty-four hours, and delay in removal of cerebrospinal fluid is comparable to the giving of smaller intravenous doses of the organisms. In some experiments animals were killed at different periods of time after the injection, and the findings indicate that the infection of the meninges must occur almost immediately after the release of spinal fluid, during an artificial septicemia. The evidence at the present time indicates that the cause of the infection is probably the pressure of the spinal fluid with associated vascular alterations. These conclusions are based on such facts as these: "(a) In the majority of cases, the exudate is largely cerebral and does not represent the characteristic distribution of a spread from a local point of infection. (b) Cultures of the cerebrospinal fluid removed during the artificial septicemia and when free from blood contamination have proved negative. (c) The withdrawal and replacement of the fluid just before intravenous inoculation, have not resulted in the production of a meningitis though it is impossible to prevent leakage of the fluid outward along the path of the needle. (d) Similar withdrawal of fluid during the septicemia, but replacement after two minutes, has not prevented the development of a meningitis." These experiments were repeated with other organisms, *B. pyocyaneus* and *B. paratyphosus* B; on the cat, and with a streptococcus strain on the rabbit. Four different organisms have, therefore, produced a typical meningitis in animals after the release of spinal fluid. Two determining factors seem apparent, that is, that the organism must possess relatively great virulence within the meninges; and the other important condition deals with the number of organisms circulating in the blood stream at the time of withdrawal of the spinal fluid; if this is not great enough no infection will take place. The authors do not want to say, however, that a meningitis may not be produced by *B. mucosus-capsulatus* by simple intravenous injection. Massive doses are required, however, and the

septicemia is the cause of death rather than the meningitis. The clinical significance of these facts seems great, and the authors are seeking data to ascertain whether the withdrawal of cerebrospinal fluid during a septicemia and the subsequent development of a meningitis holds in the human subject also.

França, Carlos. CHEMICAL TREATMENT OF MENINGITIS. [Compt. Rend. Soc. de Biol., 1917, LXXX, p. 422.]

In the year 1902, França introduced the treatment of nontubercular meningitis by intraspinal injections of lysol solution. His method has proved very effectual in severe cases; the injections are well borne, and no bad effects follow. In cases of the epidemic form the lysol acts as an antiseptic agent, and the diplococci quickly disappear from the spinal fluid. The method he uses is as follows: After removal of 25 to 50 c.c. of spinal fluid by lumbar puncture, he injects intraspinally a 1 in 100 lysol solution, from 12 to 20 c.c. for adults, and from 3 to 9 c.c. for children. If the patient's state be very grave, daily injections are given until the spinal fluid becomes sterile; this usually occurs rapidly. The only sequela seen is a yellowish tint of the palms and soles. In cases of purulent meningitis the lysol injection is preceded by lavage with normal saline solution. After the lysol injections the patient is put into an inclined position, with his head lowered. Urotropine is given as an adjuvant. França advises that his method should be used in cases of epidemic cerebro-spinal meningitis when, in spite of serum treatment, the course of the meningitis is slow and the meningococcus persists in the spinal fluid, and also in all bacterial forms of meningitis, with the exception of the pneumococcic and the tubercular. [Leonard J. Kidd (London, England).]

Netter, A. TARDY RELAPSES IN MENINGITIS. [Bull. d. l. Soc. Médéd. Hop., May 31, 1918.]

Netter discusses the probable causes for relapse in a number of meningitis patients who had apparently recovered, 1.14 per cent. out of 350 cases. Intercurrent measles was the cause in two instances. Anti-typhoid vaccination seems either to cause a reaction which simulates meningitis or which favors the proliferation of meningococci still present in the nasopharynx and otherwise harmless. In one case paratyphoid B followed soon upon meningitis and was in turn followed by meningitis and recovery then ensued under serotherapy. He says that Sainton reports a syncope after an intravenous injection of antimeningococcus serum, the patient being revived by artificial respiration.

Zingher, Abraham. VENTRICULAR PUNCTURE FOR EARLY DIAGNOSIS OF POSTERIOR BASILAR MENINGITIS. [American Journal of the Medical Sciences, Jan., 1919.]

The author claims that a prompt ventricular puncture is indicated in cases that show progressive meningeal symptoms and give a dry tap on lumbar puncture. In some patients the lumbar puncture may show a few drops of purulent spinal fluid, but a sufficient amount cannot be withdrawn, even by aspiration, with a syringe, and little or no antimeningitis serum can be injected. Even less pronounced meningeal symptoms, such as slight but definite bulging of the anterior fontanelle, tremors of the extremities and fever, should lead to a ventricular puncture in cases that have given repeated dry taps in the hands of an experienced operator. Such early ventricular punctures he believes to be of vital importance in the successful treatment of cases of posterior basilar meningitis. In adults the persistence of the clinical symptoms, associated with a persistently cloudy spinal fluid, which has become sterile after two or three injections of antimeningitis serum, indicate in many cases the necessity for a ventricular puncture. In these patients the lumbar puncture may show a sufficient amount of spinal fluid, but the outlet from the ventricles is closed off and the serum injected into the spinal canal does not reach these infected regions. Ventricular punctures should be repeated daily or every other day; twenty to fifty c.c. of fluid withdrawn and fifteen to thirty c.c. of serum injected by gravity. The serum should be of body temperature and less in quantity than the fluid withdrawn. The interval of time between the puncture, and the total number, depends upon the rapidity of the reaccumulation of the fluid. A lumbar puncture should be made when the patient is discharged to determine the reestablishment of the communication between the ventricles and the subdural space of the cord, and cases should be followed up for a period of years.

Gordon, M. H. PRODUCTION OF MENINGOCOCCUS ANTIENDOTOXIN. [British Medical Journal, Sept. 28, 1918.]

A highly toxic endotoxin from young cultures of meningococci of the two commonest types was obtained, and in testing these endotoxins against various samples of antimeningococcus serum Gordon found that several sera were very deficient in neutralizing the endotoxin although they were high in agglutinins and opsonins. Two samples of serum proved very active in neutralizing the endotoxin, and one of these was one which had given the best results in the clinical treatment of meningitis. Efforts were then made to determine a method for the preparation of serum of high antiendotoxic value against the two commonest strains of meningococci. The rabbit was found capable of elaborating such a serum, but to secure it of high degree of potency it was found necessary to avoid overdosage of the antigen in the case of Type I

meningococcus. The most satisfactory antigens for the production of highly potent antiendotoxic serum were suspensions of the dried coccus or the sensitized raw coccus.

7. BRAIN.

Tucker, B. R. THE RÔLE OF THE PITUITARY GLAND IN EPILEPSY. [Am. Med. Assoc., Sect. Nerv. and Ment. Dis., June, 1919.]

Tucker believed that convulsions, whether pathological and called epilepsy or otherwise were symptoms of underlying pathological or diseased conditions and therefore were organic and not functional. Among these underlying conditions was a secretion of the pituitary gland. He agreed with Cushing that the pituitary secretion gave a substance which had to do with cortical cell stability and that when this secretion was diminished or absent convulsions might ensue. Hypopituitarism was divided into two types: first, the congenital or chronic type, in which the patient gave evidence in the past of the usual syndrome of the hypopituitarism, and might have convulsions as he approached adolescence. The second or transitional type might present clinical evidence of normal or even hyperpituitary secretion in the past, but as adolescence approaches diminished secretion was shown by lack of perspiration, increase in fat, increased sugar tolerance, slowed pulse, lowered blood pressure, and at times convulsions. The radiographic findings in the cases reported confirmed the clinical observations. The first type showed small fossæ with enlarged processes and roughened sella, and the second type enlarged fossæ with large processes and roughened sellæ. These bony, outgrowths encroached on the fossæ. A number of cases were reported and the satisfactory result of pituitary feeding shown.

Tramer, M. EPILEPSY. [Correspl. f. Schw. Aerzte, March 15, 1919.]

Necropsy findings of fifty cases are here analyzed with the clinical records in view. His main interest focuses upon the structural alterations, however, and not upon the functional difficulties of the individual. Marginal gliosis is very frequently found, but does not explain the attacks entirely without some superimposed increase of intracranial tension. In some of the patients changes were found in the Betz' cells in the motor areas, and here the clinical course had been of a spastic type. The author haltingly admits a psychogenic element when he states the prognosis seems to depend upon it, but this admission does not seem to bear, in the paper, upon the genesis of the condition as a whole.

Maillard et Brune. EPILEPSY AND INFLUENZA. [Presse medicale, February 10, 1919.]

These authors note that it has been recognized since the time of Hippocrates and has been occasionally seen that an acute disease develop-

ing in an epileptic subject arrests or greatly reduces in number the convulsive seizures. Again, various antitoxic serums and vaccines have given encouraging results in epilepsy. Recent observation by the authors in the epileptic institution at Bicêtre showed regularly an almost complete cessation of seizures during influenza. Patients with regular paroxysms in whom, by calculation from previous observation, 105 seizures might have been expected during a certain time, exhibited only fourteen seizures during the febrile period of influenza, and most of these fourteen seizures occurred at the very outset of the rise in temperature, before the reaction against the infection had as yet to any extent developed. The authors think there may occur, as a result of the acute infection, some sort of a derivative or displacement from the brain to the respiratory apparatus, or an action somewhat analogous to that of a fixation abscess in severe infections. When the temperature returned to normal, however, the seizures gradually reappeared. Influenza in epileptics proved exceedingly fatal. Among sixty-three cases only twenty-two remained uncomplicated, while thirty-nine developed pulmonary, one pleural, and one intestinal complications. Thirty-two subjects in the series died—fourteen from pneumonia, fifteen from bronchopneumonia, and three from acute pulmonary edema. These unfavorable results are ascribed mainly to the fact that epileptics are predisposed to congestive conditions. Their facies in itself shows it. Their blood pressure is high and their tissues infiltrated, and congestion of internal structures, including particularly the nerve centers, is a very frequent autopsy finding. Disorders predisposing to congestive complications are to be greatly feared among epileptics. Restriction of the disease to two wards during the June epidemic was followed by apparent immunity among the patients in these wards during the October epidemic, not only in patients who had already had the disease in June but in those who, while exposed, had not developed it, such exposure having apparently sufficed in itself to establish immunity.

Hartenberg. PREMONITORY SIGNS OF EPILEPTIC SEIZURE. [Paris Mèd., April 17, 1919. J. A. M. A.]

Hartenberg discusses the sensations: chilliness, pruritus, tickling in one nostril, neuralgia and other sensory disturbances which may herald the approach of the seizure; also the circulatory signs, the motor, visceral and secretory, and the psychic signs which warn of the impending seizure. Besides these generally known premonitory signs, he calls attention to certain phenomena in some of his patients which herald a seizure. In one, the eyes grow more brilliant and the glance fixed and strange; in another, only one eye shows this change. In one child of 4, the pupils become extremely dilated; one adult sees a spark constantly floating in front of his right eye for two days before the seizure. Another has convergent strabismus come on, and in another the seizure is

preceded by the whole face being twisted to the right side. In two women, the nose becomes very red a few days before the crisis; in another, merely the nostrils grow red. In one man, the ears grow red, especially the left ear, the side of the severest spasms. On man's cheeks grow blue, and another perceives a pulse in the epigastrium just before the seizure comes on. Another man sweats profusely on the days the seizures impend. Another epileptic has chronic coryza with profuse discharge, but on the day or two preceding a seizure this discharge dries up, and the man is constantly rubbing his nose. There is a constant rise in temperature of half a degree C. during the days preceding the seizure in three women of 18, 68 and 69. One feeble-minded boy of 8 announces the approaching seizure by beginning to tell of grandiose schemes for the future. The ages of the patients range from 4 to 73 years. By heeding the premonitory signs, the epileptics can be saved mishaps from seizures occurring unawares, and by compiling a complete list of the prodromes light may be thrown on the nature of the seizures, and possibly means of warding them off discovered.

Mirallié, C. DIETARY TREATMENT OF EPILEPSY. [Bull. Acad. d. Méd. d. Paris, April 1, 1919.]

The author reports on a series of salt free diet therapies in 183 epileptics in which a bromide sedative is allowed in small doses. No benefit was apparent in 20. Improvement was present in 52. Disappearance of seizures in 3. Neither the age of the patient nor the duration of the disease seem to affect the result. This therapy was kept up four or five years. In 60 per cent. of 161 cases, there has been cessation of attacks now lasting in some for 12 years.

Dandy, W. E. FLUOROSCOPY OF THE CEREBRAL VENTRICLES. [Bulletin of the Johns Hopkins Hospital, February, 1919.]

Dandy reports very satisfactory results from the study of the lateral cerebral ventricles, which, when filled with air, can be well seen under the fluoroscope. To obtain the best results, the patient should be in a recumbent position and the vertical rays should be used. Twenty-five patients were studied by this method, with as good results in adults as in children. Cases of hydrocephalus may be diagnosed at all stages of development by the fluoroscope. One case is described in which the diagnosis of ventriculocoele, or false ventricular hernia, associated with an advanced hydrocephalus, was established by this method of diagnosis. In this child the air from the ventricle was seen to pass directly into the swelling. The diagnosis was later confirmed by autopsy. The results obtained by fluoroscopic study and ventriculography are very similar, and following the injection of air into the ventricles both methods should be employed.

Raeder, O. J. FAT IN CEREBRAL CORTEX. [Arch. Neur. and Psych., Vol. 1, No. 5. J. A. M. A.]

Three apparently normal brains from persons of about the same age and of the same sex were examined by Raeder. One of the specimens was obtained from a case in which trauma caused the death. In the other two cases, death was due to bronchopneumonia. In both these cases there was a slight edema of the pia arachnoid membranes. The consistency of both brain specimens was said to be normal. The somatic changes were similar, being due to an acute bronchopneumonia in both cases. Besides this there were acute changes in the liver, kidneys and spleen, and in one case slight hypertrophy of the heart with some dilatation of the right side. Twenty blocks were selected for microscopic examination from each hemisphere, after treatment with Marchi, sudan III, cresyl-echt-violet and Weigert staining methods, making forty sections of each brain, or 120 in the three cases. This report deals with the Marchi and sudan III reactions. Fat was found by far more frequently in the fourth and sixth layers—from 63 to 80 per cent.; the next most frequent location being the seventh zone—25 per cent. Fat was found in negligible amounts in the first, second and fifth layers. In the two cases with terminal infection there was a remarkable increase in fat in the third and seventh layers—from 53 to 65 per cent.—as against 7.5 per cent. in the third layers, and 25 per cent. in the seventh layer of the apyretic case. Higher temperatures apparently affect the third and seventh layers. The fat was found irregularly distributed in the cells, both in a general way, in the periphery. The nucleus was never displaced. In some instances the pigment was found bunched at one end or on one side of the cell, sometimes in the fundus, sometimes encroaching on the axon. In other instances, it was more evenly scattered about the periphery of the cell. It was found in the form of minute droplets of varying sizes. The droplets do not coalesce, but keep their spherical form even when closely packed at a given point. Fat was found more generally in the vessels of the cortex, but less frequently in the white matter. The fat was not found in droplets, but it seemed to coalesce and appeared in variously shaped and irregular masses, often at bifurcations or near branches, being irregularly distributed, some twigs being fat free. This irregularity may be correlated with the peculiar anatomic structure of the cerebral vessel.

Holmes and Horrax. SPATIAL ORIENTATION IN CORTEX. [Arch. Neur. and Psych., Vol. 1, No. 4. J. A. M. A.]

The chief symptom in the case cited by Holmes and Horrax was inability to orientate accurately in space objects perceived by either central or extra-central vision, and especially to recognize the absolute relative distances of things seen, though by touch and sound he localized sensible objects as readily as normal persons. His power of distinguish-

ing and comparing lengths and sizes was similarly affected. Stereoscopic vision was abolished; he was unable to see tridimensional objects in perspective and to recognize depth in anything. These symptoms disturbed the performance of various actions in which he relied on sight for guidance. He also presented a severe disturbance of visual attention, which made him unable to perceive readily or at all objects outside macular vision when his attention was held by that on which his eyes were fixed, and a failure to explore space spontaneously with his eyes; yet objects which threw even large images in his retina were generally perceived whole. Further, he was unable to evoke topographic memories acquired in the past and to learn his way in new surroundings. Finally, he had various anomalies of the ocular movements and reflexes, as failure to fixate promptly objects seen, to accommodate near objects, and to blink reflexly to threatening gestures. His visual fields were reduced by blindness of both lower quadrants, but the acuity of central vision was good.

Vandenbossche, M. A. WAR WOUNDS OF THE CRANIUM AND BRAIN. [Bull. et mém. de la soc. de chir. de Paris, 1918, 131.]

Vandenbossche's contribution is based upon ninety-two interventions, mostly on the eastern fronts at the outbreak of the war. He sets down only those facts which he thinks will be of particular interest. In dividing his cases into penetrating and nonpenetrating, according as they are intra- or extradural, he does not imply the absolutely benign character of the one or the malignity of the other. With the dura mater intact, there may be produced "hematocerebral" foci, which may organize and thus explain certain late functional disturbances following these wounds. A projectile grazing the skull may produce intradiploic fractures, detectable as bluish ecchymoses under the bone. The possibility of infection and necrosis demands intervention. The same is true of small wounds, produced by fragments of grenades, by the nickel jackets of the German and Bulgarian bullets, and by splinters of shrapnel, and, which seem of no importance, Vandenbossche has verified, in his series, the predominance of lesions of the inner table, a fragment of which often slides for some distance under the endocranium, and must be removed to prevent the later occurrence of pain, epilepsy or serous cysts. Tangential fractures are found to be the most common and, according to the force and the point of contact of the projectile, may cause stellate fractures in which the radiating fissures may be quite long, or gutters which correspond exactly to the size of the projectile. Stellate fractures are frequent in penetrating wounds. The principal finding in this class is the existence of numerous fragments of bone buried in the brain. Radiographically, these show as a string of white spots and lines. Occasionally "punched out" fractures are encountered, with penetration and retention of the projectile. These are not fatal.

The projectile, after perforating the bone, sometimes falls out exteriorly. Bipolar fractures are the rarest, probably because most of them are fatal on the field. The author saw two cases of direct fracture of the base from fragments of a bomb passing through the orbit. The meninges are torn, more or less regularly, according to the missile or bone fragment. But once did he encounter a wound of the meningeal arteries (posterior branch of middle). The superior longitudinal sinus seems most often injured (four times in ninety-two cases). The mortality of the series was 39 per cent., but it must be recalled that these cases all occurred at the beginning of the war, all infected, and most patients having meningoencephalitis, abscess or cerebral hernia on entrance to the hospital. But two died of tetanus; one late, after cicatrization. Nine cerebral hernias with six deaths and two cures of three years' duration, and one death from tetanus after the cure of the hernia; five cerebral abscesses; four cases of inclusion of a projectile, of which but one was removed, the patient remaining cured after two years.

Scott, H. H. CENTRAL NEURITIS. [*Annals of Tropical Medicine and Parasitology*, Oct. 31, 1918. J. A. M. A.]

Scott analyzes a certain epidemic which broke out in the earlier months of 1917 among the laborers on a sugar estate in Jamaica. The onset in each case was sudden, the patients being attacked while at work and apparently in good health. The initial symptoms in all cases were conjunctivitis and stomatitis. Thereafter the patients could readily be divided into two categories: (1) with intestinal symptoms; (2) with nervous symptoms. The diet of those affected consisted exclusively, or almost exclusively, of sugar cane. The cane tops, which are cut or broken off, are covered with small hairs which are very irritating and may have set up the original conjunctivitis and stomatitis, and, when swallowed, the subsequent diarrhea. Fresh cases ceased with the cessation of the crop or almost immediately after. No case with early diarrhea exhibited any affection of the nervous system. In nervous system cases the patients were always constipated until the final two or three days before death. Wassermann reactions with both the blood serum and the cerebrospinal fluid were invariably negative. Blood examinations revealed very little abnormality as regards total counts; differential leukocyte counts showed in all cases a marked relative lymphocytosis. Arneth index was very different from what is found normally in natives in the tropics. The morbid anatomy of the nervous cases is typical of a "central neuritis." Scott sees no reason for thinking that the disease is pellagral in nature, or that it has any relation to pellagra. There is no reason for regarding it as beriberi. There are many contraindications to the condition being a new form of "deficiency disease." There is every reason for considering these cases as representing the acute form, or acute stage, of what has for many years been erroneously spoken of

as "peripheral neuritis" in Jamaica. There is no positive evidence that the disease is microbial in origin, at least not a bacteriemia. All the signs and symptoms tend to its being a condition of "intoxication."

Genewein. PATHOLOGICAL STUDIES OF CRANIAL WOUNDS OF WARFARE. [Brun's Beitrage zur klinische Chirurgie, Band 109, 1918.]

The author first studies the problem of the effects of missiles, the mechanism of reflected bullet wounds and the value of more or less pointed projectiles from the viewpoint of rotation. As to the nomenclature of wounds of the skull, the writer is content with the following denominations: Wounds by ricochet, tunnel wounds, penetrating wounds with retained missile, comminutive wounds, and those resulting from bursting of explosives at a short range. Genewein gives a detailed description of the mechanism of the effects of bullets on the cranial vault. First there are those where the line of fracture forms radiations around the entrance aperture or on the other hand in a concentric fashion. These fractures produce a flattening of the cranial surface. One also meets with fractures resulting from secondary effects of the missile. The relative thickness of the different portions of the skull plays an important part both in the production and the type of fracture. Tracts of bullets in the cerebral substance are very large and are due to necrosis and melting down of the tissues as a direct result from the bullet, accompanied by expansion of the brain matter. Microscopic examination of the tract always offers the same picture. Following what the writer is pleased to call the large "secondary tract," a thin zone of complete necrosis is found and outside of this is a zone of transition composed of a mixture of nearly normal tissue and elements having undergone necrosis or those of hemorrhagic nature, the number of which decreases as the tract becomes further removed. The destructive effects of the missile diminish with the distance of the range. The effects of missiles fired at a long range are represented by indirect wounds and wound by *contré coup*. The writer also considers wounds by bursting shell, those where the missile is retained in the cerebral matter and missiles which become displaced in the brain, but offers nothing original to the subject.

Gray, H. M. W. TREATMENT OF WAR WOUNDS OF THE BRAIN AND ITS COVERINGS AT CASUALTY CLEARING STATIONS. [N. Y. M. J., 1918, cvii, 407, 457.]

The objects of treatment can be shortly summed up as follows: (1) to prevent or remove infection, thereby preventing further destruction of tissue; (2) to establish diagnosis in some cases of doubt; (3) to remove all sources of irritation to the brain, if this can be done without causing further serious damage to it; (4) in any case to procure rapid healing of the superficial parts, provided that the brain is safe. The author regrets that he has refrained from operation or has not operated

sooner upon some patients who have done badly. In all injuries it is held that operation furnishes an additional and usually accurate means of diagnosing the extent of the lesion. In minor injuries it has done no harm, so far as can be ascertained, and it renders the patient fit to return to duty at a much earlier date than would otherwise be the case. It is better to send a patient home with a healed scalp and healthy skull, inside which are the fewest possible potentialities for future brain trouble than that he should go with the prospect of a later operation on an area which is obscured by many abnormalities. If it can be shown that this is done with as great safety as attends more conservative methods, the procedure is more than justified. Sepsis and the exigencies of war will always make the proportion of failures a relatively high one.

On admission, the patient's hair should be shaved off or removed with a depilatory paste, the wound thoroughly examined (the use of a probe is deprecated), two roentgenograms taken in planes at right angles to each other, and a neurological examination made. An aperient should be given and the administration of urotropine, fifteen to twenty grains every three or four hours, begun. If the brain is injured, it is well if possible for future guidance to make a bacteriological examination of the discharge. If brain matter is exposed or exuding from the wound, operation should be carried out as soon as possible. In no case should operation be postponed for a longer period than a couple of days. The majority of wounds of the scalp should be excised, and the bone beneath carefully examined. If no further interference is made, the wounds can be sutured, usually without drainage. The wound itself should be cauterized, or desiccated by thorough rubbing with five to ten per cent. picric acid in spirits and drying with a swab. In practically all cases the area of operation can be covered in by healthy scalp by simple suture or by a plastic operation. Every case in which depressed fracture of the skull is suspected should be explored without undue delay, whether sepsis is present or not. If the edge of the wound is much inflamed and infiltrated, treatment with hypertonic saline applications or a paraffin paste usually makes it fit for excision in twenty-four to forty-eight hours.

The injury comes under one of the following varieties: 1. Cases without definite external signs of depressed fracture. Because fracture with displacement of the inner table or some other subcranial lesion may be present, it is important that operation should be carried out. If focal loss of function, even although evanescent, persistent headache, giddiness, or other more definite signs of cerebral compression are present, especially if optic neuritis co-exists, trephining should be done, even in the absence of definite laceration of the periosteum. If fracture of the outer table without depression is found, or even if the bone is merely bruised, a small trephine opening in the external table only should be made and the inner table examined. 2. Fracture with depression but

without injury to the dura mater. The fractured and probably septic bone is excised either by making a very small trephine opening outside the soiled area and completing the removal with a skull-cutting forceps, *e.g.*, DeVilbiss, just wide of the shattered bone, or by the nibbling method, using a properly devised small gouge forceps. If the dura is apparently normal and the brain pulsates well, the operation can then be completed by suture of the scalp with or without drainage. If, however, the dura is muddy-looking, if there is loss of pulsation and circumscribed loss of elasticity, especially if focal symptoms have been present after the wound was received, the dura should be opened.

Short. SURGICAL SHOCK IN CRANIAL INJURIES. [British Journal of Surgery, January, 1919.]

Short made investigations on surgical shock and allied conditions at a group of casualty clearing stations in France. The term of shock was reserved for depressed vitality due to traumatism, and not including concussion or hemorrhage. The loss of blood up to a pint did not by itself harm a healthy man. Delayed or secondary shock was attributed to toxemia from intestinal paralysis. Syncope from mental effects, such as pain or emotion were considered transient phenomena. A very potent factor was toxemia from acute streptococcal infection or incipient gas gangrene, and often confused with shock and accounted for the majority of cases of delayed shock. The phenomena of surgical shock are pallor, loss of muscle power, and tone, some blunting of the mind, rapid, weak pulse, fall in blood pressure, subnormal temperature, and reduced urine. The knee jerks were normal except in cases of deep shock when they were lost. The alkali reserve of the blood was reduced. The acidosis was increased, but considered an accessory rather than an essential factor. The adrenalin content of the suprarenals, confirmed at autopsy, was not reduced. Experiments showed that the blood in shock was not toxic to another animal. The bloodvessels were contracted. The popular belief that shock was due to an exhaustion of the vasomotor center was not upheld. The superficial veins were contracted and often in a state of acute spasm. The red blood corpuscle count was greater in the capillaries than in the veins. The nerve cells of the sympathetic ganglia and of the spinal cord showed no changes. The sensory nuclei of the brain showed a profound loss of Nissl granules, indicative of cell exhaustion. The motor nuclei were normal. The Purkinje cells of the cerebellum, showed considerable loss of Nissl granules in most cases. Similar changes were produced by profound exhaustion and the normal appearance of cells could be restored by sleep. It is the shock hemorrhage syndrome that called for treatment. There was a slight but definite value in giving fluids. A hot alkaline drink was given to counteract the acidosis. Saline by rectum and subcutaneously were often helpful to a certain extent, but a treatment based upon morphine

injections with the object of giving the patients sleep and rest instead of disturbing them by the rectal injections was preferred. The use of heat in the prevention of shock, also proved of value in the cure. In order to secure sleep the patient's ears were filled with cotton plugs, and the men were put in a quiet and secluded place. Adrenalin was considered dangerous. Strychnine was regarded as useless. Alcohol was harmful, especially after ether or chloroform had been given. Pituitary extract was only useful when intestinal paralysis was present. Digitalin was useful in combating the condition. Blood transfusion was far more useful and lasting as a remedy for the shock hemorrhage syndrome than any of the other remedies used. But it was not always possible to apply this treatment.

Weissenbach, R. J., and Audibert, M. BRAIN INJURIES. [Lyon Chir., Sept., 1918. J. A. M. A.]

Weissenbach and Audibert warn that the presence of some foreign body is indicated when there are recurring aseptic puriform meningeal reactions. In a case described this recurring reaction occurred in the course of a suppurative ventricular ependymitis consecutive to a scrap of shell having penetrated the brain. The symptoms from the meningeal reaction subside but as the underlying cause persists, the reactions develop anew. The prognosis is thus grave unless the primal cause is sought and removed. Albert advocates primary suture after wounds of the skull and brain and reports twenty-nine cases to illustrate the advantages of suturing the dura at once without draining. After the wound has been thoroughly cleared out, the danger of infection is always from without. Hence, by prompt suture of the dura and of the scalp, this danger is averted. Drainage should be reserved for the entirely exceptional cases, and tamponing of the wound should never be done. He describes in turn the different classes of wounds, and states that in his twenty-nine cases the immediate results were excellent in all but two cases in which the dura had been torn so much that the suture could not be realized. Even if it is known that there is an inaccessible splinter in the depths of the wound, he insists that primary suture is still the best procedure, ensuring healing by primary intention.

Babinski, J. ANOSOGNOSIA. [Presse médicale, January 16, 1919.]

Babinski reports on several cases of left sided hemiplegia presenting a peculiar mental attitude in virtue of which, in spite of relative preservation of the intellectual functions so that they are able to answer most questions correctly, they appear to be unaware of their paralytic condition and make no complaint of it. When requested to raise the right arm, they do so at once in a normal manner; when requested to raise the left arm and then asked whether they have done so, they either remain silent or answer "Yes," although the arm has not moved. One patient,

when requested to watch his arm and then told that he was not executing the command to raise, did not seem surprised or disturbed at the fact, but merely answered: "It is because it moves less quickly than the other." For this condition Babinski proposes the term anosognosia. A noteworthy feature is that such patients show anesthesia with more or less complete loss of deep sensibility and of the sense of position. This is probably a prerequisite to the anosognosia, yet does not entirely account for it. There is present a special psychic disturbance. It is as if the patient had completely lost interest in his paralyzed arm, was incapable of fixing his attention upon it, and, as it were, no longer had any remembrance of it. This disturbance is probably the result of a cortical lesion. It sometimes passes off very rapidly.

Besta, C. TESTS FOR MOTOR FUNCTIONS. [*Riforma Med.*, Oct. 26, 1918.]

This observer has devised a series of tests analogous to Barany's finger tests. Lesions in the parietal lobe may give signs similar to those resulting from cerebellar lesion. He reports upon a number of other tests, in which various muscle groups are called on. The value of these tests after brain injury is emphasized. They constitute a new chapter in the history of cortical localization. If the arms, for instance, are raised vertically and, with bandaged eyes the trunk is twisted and then brought back it is left at more or less of an angle to its original position in certain pathologic conditions. The legs behave differently in this test on the sound and affected side. Walking along a straight line, back and forth, for 30 or 40 feet and then continuing with eyes bandaged reveals in pronounced form the tendency to deviate to right or left.

Best, I. HEMIANOPSIA AND MIND BLINDNESS DUE TO INJURIES OF THE BRAIN. [*Arch. f. Ophth.*, XCIII, 49.]

This paper is based upon the observation of thirty-eight cases of homonymous hemianopsia caused by injuries during the war. In no instance was the optic tract affected; they were all injuries of the occipital lobe or of the optic radiation. Best commences with a physiologic introduction. The cortex around the calcarine fissure is the end of the visual path and the cerebral termination of the retina. Defects in the calcarine area cause a scotoma in the corresponding area of the visual field of both eyes. Therefore there must be a differentiation in the calcarine area that corresponds to the directions of the space. He therefore believes in a fixed localization within the calcarine area, whilst Monakow and his followers adhere to the theory of a diffuse representation of the optical impressions within the cortex. But a consideration of the calcarine area leads to the conclusion that physiologically we must accept a "central station with given space values." For the calcarine area is the place where the relationship between the corre-

sponding points of both retinae is established and where the optic impressions of the two eyes are blended into one sensation. In the calcarine area, and partly also in the external corpus geniculatum, whose function cannot yet be separated from that of the calcarine area, we must find the solution of the old problem as to why we see single with two eyes. An exact fusion of the retinal pictures of the two eyes is impossible without a special representation of the retina within the calcarine area. The symptoms from a shot through the occipital lobe are then dealt with. If the calcarine area is affected, the most prominent symptom is the hemianopsia. But it is not the only functional defect. We find, furthermore, defects in the faculty to localize within the space; alterations in the relationship between the visual impressions and the impressions of the sense of touch (and the muscular sense); defects in the associated movements of the eyes, and finally mind blindness. These sequelæ are due to the fact that the calcarine area is only one part of the large center of association located within the occipital lobe, and that in consequence of the protected site of the calcarine area it can hardly ever be injured without considerable injury to the neighboring regions. Very little is known regarding the function of these regions around the calcarine area, "the visual sphere in a larger sense." Theoretically it may be assumed that the calcarine area is in close relationship to the two centers: (1) The motor centers of the eyes: (2) The centers within which the transformation of the visual impressions into mental perceptions takes place. Defects in the associated movements of the eyes are due to a preponderance of the impulse from the seeing half of the retina, if the other half has become blind. They are not rarely met with and consist most frequently in loss of convergence and loss of reflex movements. Small degrees of mind blindness are invariably found in hemianopsia. It is necessary to make a sharp division between disturbances of the localization of objects within the space and the amnesic-agnostic defects. In the latter the memory of previous visual perceptions has become lost, so that the patients are not able to recognize common objects, knives, pencils, etc., as such, although they see them. This is mind blindness in a more circumscribed sense, or optic agnosia. Other forms of it are "alexia," agraphia, and a form in which the counting of numbers is affected. Sometimes one, sometimes more, or all of these different forms of mind blindness have been found. All cases were treated in field hospitals not very far behind the front. All were fresh injuries, seen on the very first or within a few days after being wounded. The observation extended over two to four weeks, after which time the patients had recovered sufficiently to be sent farther back. Of the hemianopsias 30 per cent. were bilateral; 26 per cent. were right, and 44 per cent. were left sided. The preponderance of left sided hemianopsia is marked. This seems to prove that injuries to the right half of the brain are more frequent than those of

the left. And some authors have maintained that the right half is more frequently hit by missiles in consequence of the position of the head when the soldier holds a gun. But Best does not accept this fact, as many cases are hit when the head is not just in that position. Best gives another explanation. He thinks that at the front injuries to both sides of the cerebrum are about even in number, but that a similar injury on the left hemisphere is more frequently fatal than on the right. If the left side is injured, the consequence is loss of speech and loss of movements of the right side. For this reason the chance of being discovered and removed in time is considerably less. In other words, the difference between right and left sided hemianopsia is due to the fact that a larger percentage of the former die before they reach the hospital. In the majority of the cases the hemianopsia was not caused by a direct injury to the calcarine area, but indirectly, by hemorrhage, hematoma and local softening. In 55 per cent. there was an injury to the dura mater; in 34 per cent. there was none (in the remainder of the cases, there were no data on this point). Shots through the occiput caused hemianopsia in 66 per cent. of the cases. Considering the relatively small size of the calcarine area and its protected location (its extreme periphery only lying close behind the bone), this high percentage is in accord with the previous statement of indirect causation. Of the cases, 12.8 per cent. ended fatally; 2.3 to 3.6 per cent. may have had the same result later on at home. The author therefore estimates at 15 per cent. the fatality of shots through the brain with hemianopsia, which are treated in field hospitals behind the front. In no case did the injury result in complete blindness. Even in cases where there was no perception of light for five days, some vision returned afterwards. Considerable improvement of the central vision as well as the peripheral was the rule. This improvement continued for quite a period after their dismissal from the field hospitals. In some instances a hemianopsia, that existed immediately after the injury, had disappeared entirely after a few days. This favorable prognosis was to be expected; for shots that destroy one or both calcarine areas must make such a large wound that they cause death immediately or very soon.

McKendree, C. A. NASOPHARYNGEAL CARCINOMA AS BRAIN TUMOR. [Neurological Bulletin, February, 1918.]

The patient reported showed a right sided itching of the tongue; a sensation of coolness in the face; pain in the temporal region and forehead; a peculiar subjective sensation of the lower lip being pulled out and right internal strabismus. The onset was quite gradual and the course has been progressive. The patient had a persistent headache which grew to be unsupportable; no nausea and no vomiting. Some diplopia. No night sweats. Constipated. A basal tumor which projected up through the ethmoid plate was found.

Morquio, L. PSEUDOTUMORS IN THE BRAIN. [Arch. Españ. d. Ped., January, 1919.]

The author reports case histories of six children with symptoms of brain tumor which gradually subsiding led to a more extended study. The youngest was three and the oldest twelve years of age. In two there had been a trauma; one child had a positive Wassermann. Headaches were not continuous, but occurred in paroxysms. The attacks lasted a few hours or days followed by periods of calm. In some it was occipital, in others frontal, in still others the headache was diffuse. In some it seemed to be relieved by vomiting. Headache started when the children arose; sometimes it appeared irregularly but more commonly after eating. Some of the children had pain on pressure of the skull over the frontoparietal groove. At necropsy of one child with intercurrent diabetes insipidus, nothing suggesting a tumor was found to explain the symptoms during life except a focus of softening in one peduncle. The experiences related justify trephining in cases of apparent brain tumor in children. If this relieves and the symptoms show a tendency to retrogress, the operation can stop there. This alone would arrest and possibly cure the pseudotumor disturbances. If there is an actual tumor, the operation can be completed later, although, Morquio adds, the outcome is almost inevitably fatal, even in cases of simple hydatid cyst. The complete syndrome of a brain tumor in a boy of twelve kept up for four years with intermissions and intermittent otitis and final tuberculosis. Necropsy failed to disclose any tumor in the brain. The youngest child died five months after a negative operation for supposed hydatid cyst. The brain symptoms had entirely retrogressed after the operation but returned in an acute form five months later. No necropsy. The negative operation for a mistakenly assumed hydatid cyst proved fatal in one girl of nine with hemiplegia and aphasia. Nothing to explain the hypertension and paralysis could be discovered at necropsy. In the sixth and last case, the boy of nine with the complete clinical picture of brain tumor and optic neuritis was taken into the hospital for study of the case. He acquired a mild typhoid, with a relapse, and as this subsided all the brain symptoms disappeared with it to complete recovery. [J. A. M. A.]

Spiller, W. G. TELANGIECTASIS OF THE BRAIN AND ASSOCIATED MOVEMENTS. [Am. Med. Assoc., Section Nervous and Mental Disease.]

A boy twelve years of age had a right hemiplegia from birth. He had telangiectasis of the left forehead, left side of the scalp, a spot on the left eyeball and a small one on the back. At this age he began to have convulsions, with bilateral involvement and associated movements of the left hand and foot, necessitating similar starting movements of the right side. A similar tumor of the brain was diagnosed, operated on successfully with marked improvement of the patient. Spiller discussed the pathogeny, classing them as congenital tumors.

Borries, G. V. BRAIN ABSCESS AND RESPIRATORY PARALYSIS. [Ugeskrift for Læger, Feb. 20, 1919. J. A. M. A.]

Borries reports a personal case of this kind and analyzes forty-seven he has found on record. It does not seem to be generally known that it may prove possible to resuscitate the patient even with complete arrest of the respiration, by immediate incision down to the brain abscess. Artificial respiration is only a makeshift and does not save the patient. There is one case on record in which touching the medulla oblongata with the finger started the breathing again, and this might be tried as the last resource. It acted possibly by releasing the impacted cerebellar tonsil. The Trendelenburg position may aid. Tracheotomy was done in seven cases, but it was probably done from misapprehension of the cause of the apnea. Artificial respiration and immediate incision down to the abscess should be tried in even the most apparently desperate cases. Coma with a brain abscess is no contraindication to the operation. Only in twenty-one of the forty-seven cases was the abscess opened up. The immediate effect of incising and clearing out the abscess was startling. In Borries' case the livid face abruptly changed to the normal tint and spontaneous respiration started up the moment the skull was opened, even before the dura had been incised. Borries' patient was a woman of 34 with symptoms of an otogenous cerebral abscess, and the sudden paralysis of the respiration was combated with artificial respiration and an incision in the temporal lobe. The woman began to breathe spontaneously and had no further disturbance in respiration till her death from the effects of the large abscess extending into the occipital lobe, found at necropsy. Borries is inclined to regard circulatory disturbance from some trivial cause as the last straw that upsets the precarious balance of the brain suffering from the compression by the abscess, tumor or accumulation of blood. This sets up a vicious circle. In his compilation of forty-seven cases, the lesion was in the cerebellum alone in thirty-two and in the brain alone in thirteen. The paralysis of respiration followed on lumbar puncture in quite a number of cases. Tabes and various poisons were responsible for it in other cases, and there are undoubtedly many instances of death from stoppage of breathing from an intracranial lesion, without special recognition of this factor.

Armitage, F. L. ABSCESS OF BRAIN SECONDARY TO LIVER ABSCESS. [Journ. of Trop. Med. and Hy., April 15, 1919.]

Amebic abscesses of the liver are a not infrequent cause for brain abscess. Forty-eight cases are recorded to date. The case reported by Armitage is one already recorded. The patient, aged 35, entered the hospital, with a history of rigors, jaundice, pain in the region of the gallbladder and rise of temperature to 103° F. evenings. Hepatic abscess was discovered and operated upon. About six weeks later drowsi-

ness and listlessness came on. There was no pain, he slept fairly well, but was disturbed by a cough. The pulse varied from day to day. The urine and feces were passed involuntarily. His mental condition improved somewhat, he spoke rationally. A troublesome hiccup developed one day before his death; he had a mild headache. The temperature during the last fortnight was usually about 101° F., the highest being 102° F. There were no localizing symptoms. He died fifteen days after the onset of cerebral symptoms. An abscess was found in the lower inner region of the right frontal lobe extending into the right ventricle. There was an area of softening and localized basal meningitis. The parasites were found similar to those found in the liver abscess.

Roncali, D. B. EXPERIMENTAL TUMOR OF THE BRAIN. [Tumori, Oct., Dec., 1918.]

The author here states he has produced experimentally a gliofibro-endothelioma in the brain. He introduced the endotoxins and exotoxins of blastomycetes within the skull in twelve dogs. In five dogs the tumors developed. These at first were in the nature of inflammatory protective proliferations, but they later took on autonymous powers of proliferation, he maintains.

Daland, E. M. CHORDOMA. [Bost. Med. Surg. Journ., May 22, 1919.]

The author reports a notochord teratomatous chordoma in a young woman, thirty, who had headache, swelling in the neck and symptoms of pressure on the laryngeal nerves. A mass later appeared in the right cervical region. Operation by curretting removed much of the mass with amelioration of the symptoms. The tumor recurred however. From the symptoms of cranial nerve involvement mentioned by the author it is not impossible that an intracranial development has taken place, a type of case reported by Jelliffe and Larkin (JOURN. NERVOUS AND MENTAL DIS., Jan., 1912), one of the first reported in English literature.

De Sarro. HEMIPLEGIA IN TYPHOID. [Policlinico, Jan. 19, 1919.]

This author reports two cases of typhoid embolic processes causing hemiplegia with a review of the literature. In one patient, a girl of 14, the embolus was in the left brain and caused a persisting aphasia. In the other patient a favorable recovery from an acute hemiplegia with convulsive initial phenomena.

8. NEUROSYPHILIS.

Toyama, I., and Kolmer, J. A. BRUCK'S NITRIC ACID REACTION WITH SERUM AND CEREBROSPINAL FLUID IN SYPHILIS. [Journal of Cutaneous Diseases, 1918, Vol. XXXVI, p. 434.]

Wassermann and Bruck tests with ninety-four serums (the Bruck tests being conducted with fresh active serums) yielded similar results

with sixty-five serums, or 70 per cent. All of the positive reactions with both tests occurred with the serums of persons manifesting the lesions of the secondary and tertiary stages of syphilis and undergoing treatment with arsphenamine (arsenobenzol of the Dermatological Research Laboratories). With the serum of twenty-three persons, or about 25 per cent., the Wassermann tests were negative and the Bruck test positive; eight of these serums were from persons regarded as non-syphilitic and the rest (fifteen) from persons in the secondary and tertiary stages of syphilis undergoing vigorous treatment with arsphenamine and yielding positive Wassermann reactions on admission to the clinic and prior to the time when the Bruck tests were made. According to the results, therefore, the Bruck test was found to yield presumably about 8 per cent. falsely positive reactions; also that the property of syphilitic serum responsible for the Bruck test probably under treatment for a longer period than the reagin or Wassermann antibody. With the serum of six persons, or about 6 per cent., the Wassermann tests were positive and the Bruck tests were regarded as negative; all of these serums were from persons presenting the lesions of the secondary and tertiary stages of syphilis on entering the clinic and undergoing active treatment with arsphenamine. The results of Bruck tests conducted with eighty-nine serums in the fresh active state and again after inactivation (heating) showed similar results in 85 per cent.; in 13 per cent. the reactions were positive with active and negative with inactive serum; all serums were from cases of secondary and tertiary syphilis undergoing treatment. It would appear, therefore, that active serum is better adapted for the Bruck test than inactivated serum. Preliminary and final readings of the Bruck test agreed in 94 per cent. of serums; with 6 per cent. of serums the reaction was read as positive in the preliminary and negative in the final reading. These serums were from persons in the secondary stage of syphilis and undergoing vigorous treatment; it would appear therefore, that the precipitate yielding a positive result in the preliminary reading may dissolve overnight and thereby render a negative result in the final reading. For this reason the preliminary reading is considered more delicate, but more difficult to interpret and differentiate from the opalescent reactions sometimes yielded by normal serum. Bruck tests conducted with cerebrospinal fluids in amounts ranging from 0.5 to 2 c.c. were invariably negative irrespective of the source of fluid as from normal persons or those suffering with syphilis of the central nervous system and suppurative meningitis; owing to the relatively small amount employed, and from inflamed meninges, as compared with serum, the Brock test is worthless as an aid in diagnosis. While the Bruck serochemical tests is very simple, of great interest theoretically and probably of more value than the numerous other physiochemical tests of Porges and Meier, Klausner,

Herman and Perutz, and others, the reactions are less well defined and more difficult to read and more prone to error on the personal equation than the Wassermann reaction and, likewise, probably less delicate and valuable as a diagnostic reaction than the Wassermann test when the latter is properly conducted by experienced persons.

Bergeron, A., and Normand, E. APPLICATION OF A COLORIMETRIC SCALE TO THE BORDET-WASSERMANN REACTION. [Presse médicale, September 12, 1918.]

Using as primary color standard, 0.2 mil of a one in ten dilution of sheep erythrocytes. For the colorimetric tests this is further diluted, one in five, by the addition of saline solution. In a series of hemolysis tubes, numbered one to ten, are introduced in succession 0.1, 0.2, 0.3, etc., of the resulting fluid. Enough hemolysin and alexin are then added to induce complete hemolysis, and the amount of solution made up with saline to 2.5 mils in each tube. The tubes are then placed in the incubator until hemolysis has occurred. The tint in the first, or 0.1 mil tube, correspond to that produced by a ten per cent. hemolysis of red cells employed in the Wassermann reaction; that in the 0.2 mil tube to twenty per cent., hemolysis, etc. To offset the additional coloration imparted in the actual reaction by the patient's serum and the antigen, 0.2 mil of any human serum and 0.3 mil of antigen are added in each tube, thus bringing the total volume of solution to three mils. In carrying out a colorimetric determination, the centrifugated Bordet-Wassermann tubes are compared in turn with the ten tubes of the color scale. If the tube containing the least amount of antigen shows the same tint as tube three of the scale, it is known that enough free alexin has remained to hemolyze thirty per cent. of the erythrocytes in the first instance and ten per cent. in the second, and the reaction is put down as positive at 30-10. If the eighth and sixth tubes are matched, the reaction is negative at 80-60, and if the sixth and fifth, it is suspiciously negative at 60-50. This precise method permits of ready comparison of the successive findings of a single observer as well as of the results obtained in different laboratories. The scale is independent of the procedure used.

Jacobsen, C. NEUROSYPHILIS OF THE AUDITORY AND VESTIBULAR. [Ugeskrift for Læger, March 13, 1919.]

Sudden deafness, subjective noises in the ear, or vertigo with vomiting were the initial symptoms in four patients reported in this paper, due either to neurosyphilis or to arsenical action as a Herxheimer reaction to arsphenamin. The author advocates a preliminary use of mercury in all the type of case here reported in order to avoid the kind of accident that seemed to result from the use of arsphenamine.

Downey, J. W. THE STATIC LABYRINTH IN SYPHILIS. [Trans. American Otol. Soc., V, 24, part 2.]

Both divisions of the eighth nerve will be affected in neurosyphilitis and, therefore, the auditory and the labyrinth should be tested. Patients with syphilitic acoustic neuritis may hear the voice surprisingly well and may not complain of deafness until questioned; the tuning forks, therefore, offer the best means of correct diagnosis. The typical hearing defect is a shortening of the duration of perception by bone conduction, out of all proportion to the shortening of the duration of perception for the same fork by air-conduction, the retention of good hearing for the low forks, with a loss of perception, or a reduction in duration of perception, for sounds of high pitch. The most characteristic reaction of syphilitic internal ear disease in the static labyrinth is a lowering and confusion of all the responses and this may vary from a totally dead labyrinth giving no responses to the cases showing all the normal reactions reduced in degree. Vertigo is absent or it lasts but a few seconds. Falling is not definite. The patient, if tested quickly after rotation, will past-point with one arm but not with the other, or will only past-point for a few inches or will past-point incorrectly. The responses may be intensified by increasing the stimulation; thus, nystagmus may be absent after ten turns in twenty seconds, but may become evident for a few seconds after ten turns in ten seconds. With the cold caloric test it may require much colder water to bring out the response. Furthermore it is apparently possible in these cases for one semicircular canal of the same ear to be more affected than the others, hence, we may get normal responses from rotation with the head in the upright position (horizontal canals) and *vice versa*. On the other hand, there may be increased irritability of the static labyrinth, evidenced by prolonged nystagmus, marked vertigo and nausea. There may be crossed past-pointing, right arm to the left and left arm to the right after turning to the right, and *vice versa*, as well as reversal of past-pointing (both arms to the left after turning to the right, and both arms to the right after turning to the left). The reactions in most instances point to the ear which is most involved and one ear is usually involved to a greater degree than the other, though both as a rule are implicated.

Sergent, E. ANISOCORIA DUE TO APICAL PLEURITIS IN SYPHILITICS. [Bulletin de l'Académie de médecine, March 11, 1919.]

This observer notes that inequality of the pupils in a subject exhibiting definite indications of syphilis is generally accepted as an unfavorable prognostic sign, suggesting early involvement of the nerve centers and tabes or general paralysis. Yet anisocoria in the syphilitic may be completely independent of central nervous involvement; it is often caused by the apical pleuritis associated with a more or less torpid, fibrotic, sclerosing pulmonary tuberculosis. In such instances it is due to excitation or paralysis of the pupillodilator.

Qualls, G. L. ACUTE CEREBROSPINAL SYPHILIS. [Military Surgeon, Jan., 1919.]

Qualls reports that patients treated by intraspinal injections of neo-salvarsan seem to improve more rapidly and more lastingly than in those receiving arsphenamin alone. The use of mercury to its limit in conjunction with intravenous and intraspinal medication of arsphenamin is good therapy in his experience. Certain cases develop their symptoms with great rapidity.

Thiebierge. PRESENT STATUS OF THE WASSERMANN REACTION. [Presse Méd., Nov. 28, 1918, J. A. M. A.]

This author, like many another, warns against undue reliance on the Wassermann reaction. Even competent and experienced biologists may obtain contradictory findings at times. It is not a chemical reaction but a test of the properties of certain substances of unknown composition, existing in unknown and certainly variable amounts, and the test is made by means of other substances of equally unknown nature present in the reagent also in unknown proportions, and associated in the reagent with a crowd of other substances, equally unknown and in proportions independent of those which are concerned in the reaction. Besides all these uncertainties is the personal equation, one observer regarding as positive what another would class as dubious or negative. Frequent control of the antigen is also indispensable to avoid misleading findings. He warns further of laboratories which play into faker's hands, reporting the reaction as always positive. In dubious cases we should demand a test by known competent authorities before making the diagnosis or starting treatment for syphilis. In the first three weeks there is a reaction in about 68 per cent. of the cases; positive results even in as many as 91 per cent. of the cases cannot be anticipated before the seventh week. After the fifth week the Wassermann test is most dependable; before this only the discovery of the spirochete is decisive. During the war, mixed chancres have become comparatively common. The seroreaction six or seven weeks after the first symptoms will reveal whether the syphilitic infection is or is not associated with simple chancre. He declares further that the seroreaction is negative in about 10 per cent. of syphilitics with active manifestations of the disease. The reaction is liable to occur also in certain skin diseases in nonsyphilitics, and even in syphilitics with these skin diseases, who otherwise would respond negatively to the test. This fact has misled some into assuming a syphilitic origin for some of these skin and other affections, including Paget's osteitis deformans.

The Wassermann reaction should not be depended on as a guide for treatment during the first year of infection. The test should be applied occasionally as it may indicate whether or not treatment should be inten-

sified, but it is folly indeed to give the patient to understand that continuing or suspending treatment depends exclusively on the Wassermann reaction as if it were an automatic therapeutic slot machine. In the later stages of the disease, it is a useful guide when positive; it is less reliable when negative. Especially with syphilis of the nervous system, in which the Wassermann reaction is often negative, the patient would be deprived of the benefit from treatment if it were suspended because the Wassermann test was negative.

Thibierge insists that this test should not be allowed to modify the old rule that consent to marriage should not be given till four years from infection—some say six years—and when eighteen months have passed without manifestation of the disease. The only modification of this rule is that, after this delay, a positive Wassermann reaction calls for further postponement until it has veered to negative. He remarks that none of the authorities in syphilology have modified this rule for any patients who have presented manifestations of the second stage of syphilis.

In regard to energetic abortive treatment, he says that to date we have no means of positive knowledge whether the patient has been actually cured or not. Theoretically we may assume this, and sometimes we find that a patient has contracted a new syphilitic chancre. But in reality this occurs less frequently than we have been given to suppose, and it is more prudent to cling to the classic rules until longer experience has settled the question. The most that can be granted is that when the initial treatment was known to have been really energetic and repeated serum tests have been consistently negative, consent to the marriage might be given in three years. In conclusion he warns against breeding or fostering syphilophobia in impressionable subjects who ascribe exaggerated importance to the Wassermann test. The physician must be extremely careful in examining and in what he says in regard to the Wassermann test to easily unbalanced persons who have been exposed to syphilis. An imprudent word or the dictum of some irresponsible laboratory will convince nonsyphilitic men of this type that they have syphilis, and they then fall a prey to fakers of all kinds.

Davis, G. E. PARALYSIS OF RIGHT VOCAL CORD IN NEUROSYPHILIS.
[Laryngoscope, XXVII, 195.]

This observer describes a patient, twenty years old, with sore throat, speaking and swallowing difficult, voice husky, enunciation indistinct. The soft palate was drawn up, uvula displaced, midway between center and left tonsillar pillar. Pharynx and tonsils not inflamed, though the tonsils probably were the seat of infection. There was paralysis of the right side of the pharynx and larynx. Family history revealed father's death at the age of fifty-four, of Bright's disease, mother's at the age

of thirty-four years, of pulmonary tuberculosis. Two sisters and one brother are living. When ten years old the patient had a severe illness, either typhoid fever or meningitis, followed by deafness in the left ear. The right ear showed low notes normal, but high notes lowered at times; stuffiness and tinnitus in right ear. Hypertrophy of the thyroid, more on the right but not enough pressure on recurrent laryngeal to produce paralysis of the cord. Diminished muscle tonus of right arm and leg, and reflexes on right. Total deafness on left and shortened right bone conduction led the writer to conclude that there was a luetic origin of paralysis; this was confirmed by a plus four Wassermann.

Ramsey, W. R. THE RELATIVE EFFICIENCY OF THE DIFFERENT MERCURIAL PREPARATIONS IN THE TREATMENT OF CONGENITAL SYPHILIS. [Arch. of Pediatrics, 1918, Vol. XXXV, p. 338.]

According to Ramsey in infants, and children, mercury is excreted at least partly by the urine when given by the mouth, by inunction, or subcutaneously. In newborn infants and older children, mercurial ointment when placed in contact with the skin, without any friction being used (protected and sealed by wax paper from being volatilized and inhaled) is taken up by the skin and eliminated in the urine and continues to be excreted in the urine for some time after all treatment has been discontinued. By inunction (with rubbing) mercury is readily taken up by the skin and eliminated in the urine and continues to be eliminated for a considerable time. When inunction is given, the maximum daily amount of mercury is usually eliminated during the following 24 hours, smaller amounts being eliminated for a variable time. Where continuous inunctions are given there is an accumulation in the system and considerable amounts are eliminated at intervals with only traces in between. It is therefore probable that it is unnecessary to have mercury in contact with the skin, either with or without rubbing, as often or as long as has been generally thought necessary. This, however, must be determined by further clinical investigation. Mercury salicylate, suspended in oil and given subcutaneously, continues to be eliminated in the urine in appreciable amounts for as long as 8 days, the daily amounts eliminated varying widely. It is therefore probable that repetition of the treatment, not oftener than at intervals of 8 days, would be sufficient. Mercuric chloride by the subcutaneous method, a favorite method in congenital syphilis, continues to be eliminated for 8 days. In all cases where mercuric chloride was used, either by mouth or by the subcutaneous method, protein was found in the urine. Calomel $\frac{1}{4}$ grain, every 2 hours, for 4 doses and gray powder $\frac{1}{2}$ grain continued to be eliminated in appreciable amounts in the urine for as long as 9 days, the maximum amount being eliminated during the 24 hours following administration. It is therefore probable that the daily use of any of the mercurial salts in the amounts usually prescribed, is unnecessary and presumably harmful.

Castex, M. R. LATE INHERITED NEUROSYPHILIS. [Preuss. Med. Arg., Jan. 20, 1919.]

Bifurcation of the spinous process of the first lumbar vertebra is said by this observer to be a frequent sign of inherited syphilis. One or more vertebræ may be involved; in one case the bifurcation was in the twelfth dorsal vertebra. Castex has no explanation.

Chotzen, F. SCAPHOID SCAPULA. [Berl. kl. Woch., Oct. 7, 1918.]

This supposed stigma of inherited syphilis has been here reported upon by Chotzen. He has found 270 instances out of a total of 400 children in the schools for weak-minded at Breslau. Chotzen was unable to discover a luetic origin in his cases. On the other hand, the history of rickets was common in the children affected. The malformation is frequently accompanied by other evidences of degeneration. Among the children with scaphoid scapula, mental insufficiency reaching to manifest idiocy was found in ten cases, five of which were instances of mongolian idiocy. Examination of 550 soldiers in active service showed that 19 per cent. had scaphoid scapula and in them the history of hereditary syphilis was not more common than in the others, but as in the case of the children the history of rickets was frequent.

Barbier, H. ATROPHY AND CONGENITAL SYPHILIS. [Bull. d. 1. Soc. Méd. d. Hop., Dec. 27, 1918.]

In 93 children with various types of muscular atrophy 33 per cent. gave a positive Wassermann reaction and in 9 per cent. additional other signs of congenital syphilis were present. The use of mercury was followed by excellent results in some of these patients, but was not well borne by others.

Sanz, F. INTERESTING CASE OF A FACIAL PARALYSIS IN A SYPHILITIC. [El Siglo Medico, 1918, Vol. LXV, p. 522.]

A man 46 years of age, four years before had suffered from a stroke of hemiplegia with resulting aphasia. Under appropriate treatment he had secured much benefit without the development of any new accident. The aphasia vanished and the asymmetry of the facial innervation had been restored. In the limbs recovery was much less in evidence and he presented a classical picture of spastic hemiplegia. His treatment went ahead, both specific and physical, and incidentally he had been badly salivated on several occasions as a result of bad mouth hygiene. These attacks interfered with the original plan of treatment. During a fresh course of injections of grey oil he was suddenly seized with left facial paralysis. The diagnosis was peripheral facial paralysis due probably to a gummos meningitis of the base of the brain involving the facial nerve. But further investigation showed the possibility of another

origin. The mercurial stomatitis had evidently given rise to a parotitis with possible mechanical compression of the nerve trunk. The Wassermann was found to be negative and on the suspension of the mercury the paralysis cleared up.

de Jong, S. I. MALARIA AND THE BORDET WASSERMANN REACTION. [Bulletins et mémoires de la Société médicale des hôpitaux de Paris, January 23, 1919.]

The author disputes the conclusion previously reached by Aimé and Lochelongue that malaria causes a positive Wassermann reaction. On the basis of 300 tests, of which two thirds were made in malarial subjects, he maintains that the Bordet Wassermann reaction retains its usual diagnostic value in malarial subjects, unless the serum examined is obtained during an actual malarial paroxysm. At this time the natural hemolytic power of the serum is often absolutely nil, as is the case in any acute affection associated with violent febrile paroxysms, and there is an apparent positive reaction through absence of hemolysis. Furthermore, this false positive reaction during malarial paroxysms is not even constantly observed, for the author obtained some negative reactions with blood obtained at the very beginning or from twelve to thirty hours after a typical paroxysm.

Wimmer, A. NONSPECIFIC MENTAL DISEASE IN SYPHILITICS. [Hospitalst., Sept. 4, 1918.]

The author calls attention to the more usual form of acute syphilitic psychoses and urges caution in referring the illness to syphilis when the disorder resembles the manic depressive psychosis. Twelve cases are described in detail in which mental symptoms resembling hysteria coincided with nervous manifestations. In one woman of 29, the clinical picture was dementia. In other cases there was an attack of mania before the infection with syphilis. Necropsy confirmed the assumption of an old endogenous manic-depressive psychosis with recent syphilitic meningitis. In another paranoid psychosis with hallucinations in a pronounced psychopathic. Even with the four syphilitic reactions positive in the spinal fluid, it does not follow that the psychosis observed is necessarily of syphilitic origin.

Wechsler, I. S. OPHTHALMIC CHANGES IN TABES AND PARESIS. [New York State Journal of Medicine, 1918, Vol. XVIII, p. 312.]

The writer gives the impression that there is no fundamental difference between tabetic neurosyphilis and so-called cerebrospinal or diffuse neurosyphilis. An inflammatory process is behind every form of syphilitic involvement and the spirochete is responsible. Obviously, the inflammatory reaction is in direct proportion to the kind of tissue involved. There is every reason why the meninges should respond more

violently than the parenchyma of the brain. The reaction, too, of the vascular, interstitial structures will be of a different nature than that of parenchymatous tissue. But lymph and plasma cell infiltration and mast cells are the fundamental characteristics of syphilis. This picture occurs in tabes, paresis and optic atrophy, just as it does in interstitial neurosyphilis or, say, aortitis. There is, therefore, no valid reason for calling a protean clinical picture cerebrospinal syphilis. In the first place, tabes and paresis are anatomically just as cerebral and spinal, and secondly, the pathology is based in all cases on a similar reaction to the same agent. I have, therefore, without being too consistent, used the term interstitial, or diffuse neurosyphilis, instead of cerebrospinal lues. The same argument, it seems, holds true when we come to the pathology of special structures, such as the optic nerve. Evidently very careful examination has revealed inflammatory reactions, even in very old cases of optic atrophy. It would seem advisable therefore to drop the term primary optic atrophy or, rather, employ it in the sense that the atrophy takes place *pari passu* with the inflammatory, exudative process. It is equally descending with an inflammatory neuritis, though the vascular changes are not nearly so violent. The deductions to be drawn are quite obvious. Without attempting to deal with the subject of therapy it may be well to point out that if the inflammatory character of optic atrophy will come to be recognized, we may be able to attempt rational and possibly hopeful treatment in cases which have hitherto been the despair of therapeutics.

La Forà, G. R. PARESIS TREATMENT. [Prog. d. l. Clinica, Sept., 1918.]

Reports of strikingly good results in the treatment of paresis by the use of intraspinal injections of arsphenaminized serum.

Hanser, A. TABES AND VISCERAL ANALGESIA. [Deut. med. Woch., Jan. 30, 1919.]

This patient died from a generalized peritonitis from a duodenal ulcer. The symptoms, which were insufficient for a diagnosis, consisted of a general toxemia, the abdomen offering few functional signs, all pain and rigidity of the walls being absent. The diagnosis was confused on account of the possibility of an intoxication, the patient being a chemist, and it was only when it was known that he was tabetic that some visceral lesion was suspected. The patient had never had and gastric crises, and the author discusses the indications that similar cases may give relative to the vegetative innervation of the viscera. The case has a practical importance, since it shows that in a tabetic the most acute symptoms of an abdominal surgical case may be wanting, a fact referred to by but few observers.

Carhill, H. NEUROSYPHILIS AND NOVARSENOBILLON. [Lancet, 1918, 194, p. 249.]

Neurosyphilis, as an ever present possibility in nervous disorders can be proved by examination of the cerebrospinal fluid. The examination of the serum, whether the Wassermann reaction is positive or negative, is of comparatively little value. If the diagnosis is made early, and prompt treatment given in adequate quantity, syphilis of the nervous system appears to be curable in very many cases. Some cases of curable meningovascular syphilis are diagnosed as incurable paresis, and treatment is withheld. Often the precise diagnosis can only be made by watching the result of treatment; therefore all cases should have treatment. Even in some cases of long-standing tabes dorsalis the syphilis appears to be entirely curable by treatment, and in nearly all cases symptoms can be greatly alleviated by salvarsan. Novarsenobillon, in the author's hands, has proved a safe and most efficient remedy against the protean ravages of the *Spirochete pallida*. Galyl is not recommended. The outlook from early neurosyphilis is bright, and will be brighter when the general standard of knowledge of neurologic diagnosis is less inadequate than it is today.

Costa et Troisier. ICTEROHEMORRHAGIC SPIROCHETES IN NERVOUS AND MENTAL SYMPTOMS. [Bull. d. l. Soc. Med. d. Hop., Dec. 6, 1918. J. A. M. A.]

Costa and Troisier have previously described what they call the psychomeningeal form of this spirochetosis. They here report three additional cases, and call attention to the coincidence in the same patient of psychic disturbances, impairment of vision and modification of the reflexes, demonstrating the profound, durable and widespread damage of meninges, brain and medulla possible in icterohemorrhagic spirochetosis. Mania and confusion persisted even after recovery, and mental weakness with instability and irritability was marked in all three of the patients. One presented stigmata suggesting degeneracy, but the others seemed to be free from any predisposition of the kind. The existence also of organic sequels, especially renal, sustains the connection between the mental impairment and the spirochetosis. This psychomeningeal form was observed only in the graver cases, with uremia (one with very high urea content in the spinal fluid), dilatation of the heart, prostration, anemia, intense jaundice, photophobia, and extreme tenderness of the eyeballs. The Wassermann reaction is usually positive during this spirochetosis, but veers to negative during convalescence; in one of the men it has persisted positive during the year to date, and there is nothing otherwise to suggest syphilis. One of the men presents also a double Babinski with exaggeration of the tendon reflexes, suggesting tonacious injury of the pyramidal tracts. Weeckers and Firket have reported cases of iritis and even a curable optic neuritis for which the icterohemorrhagic spirochetosis was evidently responsible.

Jackson, D. E., and Smith, M. T. CAUSE OF EARLY DEATH FROM ARSPHENAMIN. [Jour. Pharmac. and Exp. Therap., Nov., 1918, 12, No. 4, p. 221.]

The first toxic symptoms were a dilatation of the heart, perhaps mainly of the right side at first, a progressively increasing pulmonary blood pressure, and a slow, gradual, but not severe, fall of the systemic pressure. The cause of this rise in pulmonary arterial tension they believe to be due partly to the alkalinity of the solutions of arspnenamin used, and partly to the specific action of the drug itself. With large toxic doses the right heart may have to contract against a pulmonary pressure increased by 100 per cent. above the normal, while at the same time the left ventricle may be contracting against a systemic pressure reduced by 25 to 50 per cent. below the normal. These peculiar conditions may tend to establish a state of increased irritability in the heart, and in rare instances delirium cordis may result. The reactions of the internal organs when arspnenamin is injected are variable, and the reasons therefore are obscure. Apparently both central and peripheral influences are concerned. As a rule, oncometric tracings of the spleen and intestinal loop show a dilatation, while the kidney usually contracts, sometimes in a most vigorous fashion. The toxicity of arspnenamin is not increased by the breathing of high concentrations of carbon dioxide, nor by the injection of calcium hydrate, calcium lactate, or of monosodium phosphate. A number of intermediary compounds, produced in the manufacture of arspnenamine, also studied by the authors were found not to be very poisonous, and not to be held responsible for the variation in toxicity of different samples of arspnenamin. Tyramin is suggested as the most beneficial drug in cases where severe acute toxic symptoms suddenly appear at or after intravenous injection of arspnenamin.

Campbell, Harry, and Ballance, Charles. TREATMENT OF GENERAL PARALYSIS. [Lancet, April 12, 1919.]

These authors reported in 1914 the injection of salvarsanized serum into the lateral ventricle in three cases. The first of these patients, a violinist, is still alive and has returned to his occupation though he is a little less expert than he was before. Nevertheless his cure has been apparently complete, except for the fact that destroyed cells could not be restored. This method of treatment was employed because it is well known that drugs introduced into the blood stream do not reach the parenchymatous tissues of the brain in effective concentrations, while drugs free in the subarachnoid space do bathe and penetrate deeply into the cerebral tissues. The best method of introducing large amounts of a drug into this space is by injection into the lateral ventricle. Cases of general paralysis are unfortunately not often diagnosed until there has been extensive damage to the cerebral cortex, whereas the greatest bene-

fits from treatment can only be expected when it is carried out before such damage has been done. It is therefore necessary to make the diagnosis in the preclinical stages when possible. The Wassermann reaction is of the greatest assistance in this connection, for a positive reaction in the spinal fluid indicates that the central nervous system has been infected. In general paralysis both the blood and spinal fluid are almost invariably positive, and if the blood is negative the chances are almost 100 to one that the case is not one of general paralysis. In every case of syphilis if the blood remains positive after vigorous treatment with salvarsan and mercury the spinal fluid should be examined. If it is found positive spinal subarachnoid injections of salvarsanized serum should be pushed, and if the fluid still remains positive following that treatment it is probable that the cerebral parenchyma is infected and the case is potentially one of general paralysis. In such a case the salvarsanized serum should be injected into the lateral ventricle. It is further suggested that since the optic nerve carries sheaths from the dura, the pia and the arachnoid, the space beneath the latter communicating directly with the substance of the nerve, injection of this space should prove a valuable method of treating syphilitic lesions of the nerve. Whether the injection should be made by way of the lateral ventricle or directly into the subarachnoid space through the outer angle of the sphenoidal fissure remains to be determined.

III. NEUROSES, PSYCHONEUROSES AND PSYCHOSES

Boven, W. RELIGIOUSNESS AND EPILEPSY. [Schweizer Archiv für Neurologie und Psychiatrie, Vol. IV, No. 1.]

The author presents this study in order to stimulate greater interest in discovering the mental content particularly of the epileptic delirium and the relation of this to the crises. He reports chiefly here concerning the religious dreams and phantasies which his patients manifest. The first patient quoted manifests an epileptic delirium stuporous in form. He lies quiet for hours and as if in an ecstatic vision. His own report of the experience is that God speaks with him telling him that He does not wish him to recover. God appears to him like a hostile and malevolent judge, as if he drove him back from Paradise. The patient is afraid and has a confused feeling of chastisement or of pardon. God appears in conventional popular form as an old man, described in great detail but not with perfect clearness. Angels are moving about Him and entrancing music is heard but at the base of the picture is a devouring fire. Ideas of grandeur, of prejudice and of persecution, as others, have also their place in the experience of epileptics but such religious ideas are also very frequent.

The question must arise whether the delirium is the result of the crises or whether it takes the place of the crisis, an equivalent for it, or

whether it is a manifestation of the condition out of which the crises arises. The author uses the terms metacritic, paracritic and procritic to denote these three possibilities.

Among the ideas which are met with in epileptics those of mysticism play a large rôle. They are distinguished by their ecstatic character from the mysticism of other mental affections. Melancholy may also appear which in its confused state often presents the picture of a prolonged epileptic stupor. Various opinions have been expressed as to the reason for the frequency of this mysticism in the epileptic delirium. Certain writers have believed that the depression is due to the interruption of the continuity of consciousness and that upon this are grafted a moral malaise, the pessimism of impotence, morbid religiousness. Kraepelin suggests that the idea of a divine influence and the hope of healing through a supernatural power have a favorable soil in the epileptic. Maeder's conception of this epileptic religiousness as a sublimation of the sexuality is pushed to a footnote.

Boven explains the possible drift into mysticism as follows: After an attack the patient's consciousness returns only dimly at first and he passes back by the first ray of light from death to life. Perhaps he can report nothing of these first beginnings of consciousness. But there is the confusion and disorder of sensation and the anguish of a soul submitted to a rude metempsychosis, anguish and fear would seem to be the natural results. The cenesthetic sensations are also such as would strengthen these emotions. The shadows of the unconscious gradually dissipate themselves and little by little the attention is drawn to the outside world. The death from which he has barely escaped still forces itself upon his ideas, but slowly coming into the light of reason. His condition has been one almost of nonexistence, a violent psychic and cenesthetic revulsion followed by a longer or shorter period of inertia, when he thus slowly returns to partial consciousness.

The author then cites a number of cases to show how the ideas of death which he believes could thus be expected, do reveal, themselves in the epileptic delirium. There is a preoccupation with death, visions of preparation for it, calling upon the dead and upon loved ones and the thought of sins committed, these ideas varying with different individuals and through the time of return to clear consciousness. Some extend the conception of catastrophe to the whole world. Particularly does the author note the appearance of phantasies of a flood.¹ Other patients manifested an impulsion toward aggression and a desire for vengeance. The element of mysticism may or may not appear in such cases as a phase of the delirium.

¹ If Maeder's views were not relegated to a footnote we might cite the extravagant urinary dreams and phantasies and even practises of an epileptic patient, these occurring in childhood or during the long apparently healthy intervals between infrequent attacks.

Euphoria and ideas of grandeur seem to occur at the end of the delirium or when it is growing less. Might this be, the author asks, a reaction to the anguish, also the return of a better physical condition after the preceding anarchy? Also, he asks, is the erotism, which is not absent, due to some association of ideas or to visceral sensation? The epileptic delirium resembles that of commotional delirium but their pathology is not the same.

The writer sums up his studies by saying that the confusion which follows the epileptic coma manifests the partial return to reason. It is first profound and then evokes a sort of seismological delirium by the violent exteriorisation of the cenesthetic impressions. As the attention is released from these the delirium shows more clearness, more complexity and more logic. The sensation of the revulsion becomes more restrained. The idea of death dominates. Then as connection with the external world begins to be reestablished the interpretations take on more reality, more human elements with ideas of persecution and prejudice with anger, ideas of vengeance and a more aggressive character. Euphoria follows at the close of the delirium, though this may, like the eroticism, appear in episodes. It represents on the whole an automatic effort at synthesis, an unconscious attempt to adapt to conditions which seem supernatural, an instinctive defense against the unknown.

"The frequent religious, metaphysical, mystical character of the delirium of epilepsy manifests the interpretative action of a confused mind at the traumatism of the epileptic processes. Stunned by the impressions of a rough cenesthetic experience, the psyche dreams of death, evoking among the ideas connected with it perhaps the gloomy images, perhaps, for example, the image of God. There are even ecstatic visions, those naïve spectacles like the 'miracles' of the popular stage. This is at times only one act of the delirium, at other times the entire drama." Boven believes that the religiousness of the epileptic rests upon the unconscious experience acquired during the crises and the confusion. These periodic approaches to death, the fright, the solemn apparitions of the dream, all these things impress the mind and constitute a center of preoccupation. The epileptic religious character is nourished in the dreams of the psychic paroxysms and the hope of a cure by God is a part of the euphoria of the delirium. Greater piety is often manifested after a crisis or after delirium. [Jelliffe.]

Symns, J. L. M. HYSTERIA AS SEEN AT A BASE HOSPITAL. [The Practitioner, August, 1918.]

Hysteria should be considered as a pathological condition caused, according to Babinski, by suggestion, which can be cured by persuasion. The author assumes the Babinski viewpoint. Hysteria is the subconscious representation of the patient's idea of the disease from which he considers himself to be suffering. The functional paraplegic who has

been buried, will portray, subconsciously, the symptoms that he expects to find in a patient whose spinal cord was injured, and the greater his knowledge the nearer he will get to the signs of an organic paralysis. Hemianesthesia, pharyngeal anesthesia, concentric narrowing of the visual field, and the various painful areas, such as the iliac fossa, are none of them symptoms which are likely to suggest themselves to the mind of the ordinary patient. The author purposes to analyze these stigmata, and show why they have been found by the followers of Charcot, and not by those of Babinski. The fact that pharyngeal anesthesia was frequently found in hysteria was noted by Charcot, while the fact that it is often absent in normal people, was not.

Hemianesthesia is the result of unconscious suggestion by the medical officers. The vision of all cases was examined by the rough finger method, which involves no suggestion, and have found the field of vision normal.

The tender point over the anatomical site of the ovary said to be indicative of hysteria in women, although Purves Stewart quotes Steinhäusen as finding it in 88 per cent. of 500 normal soldiers, was not found by the author.

The observation that hysteria does not arise in the field is borne out by the statements of medical officers, as quoted by Babinski and Froment. Hysteria is caused by suggestion. With the rest and reaction after the strain of action, the patient has the time and opportunity to think and brood over his condition, and then the hysterical symptoms appear.

The author proposes to note the chief types met with. (1) *Hysterical Gaits*. (a) The tacking gait, in which the patient is unable to keep to a straight line and tacks from side to side. (b) The pseudo-ataxic gait, which varies from a mere difficulty in walking to an absolute loss of equilibrium. (c) The pseudo-spastic gait, in which arms and legs and body are held rigid. (d) The unilateral gait, in which the patient moves with a lateral swaying movement. (e) The senile gait, in which the back is bent and the patient walks with two sticks. (2) *Hysterical Paralysis*. (a) Pseudo-hemiplegia. (b) Pseudo-paraplegia. (c) Pseudo-monoplegia. (d) Pseudo-paralysis of an anatomical region or a group of muscles. (3) *Hysterical Contractures*. (a) Hysterical club foot, in which the foot is immovable and extended, and the patient walks on the external border of the foot. (b) Hysterical contractures of the hand, resulting in the typical "main d'accoucheur," or, in other cases, in the flexion of one or more fingers. (c) Hysterical contracture of muscles. (4) *Hysterical Tremors*. (a) Generalized atypical tremors. (b) Limited atypical tremors. (c) Typical tremors, which are similar to those found in disseminated sclerosis or paralysis agitans. (5) *Hysterical Errors of Speech*. (a) Dumbness. (b) Peculiarities of speech: (1) Stammering. (2) Latent period between words. (3) Inarticulate. (4) Whispering. (5) Associated movement of limb. (6) *Hysterical Fits*.

(a) Emotional, rarely seen in our experience but common among the French, who describe them under the term "grande hystérie." (b) Pseudo-epileptic, which represent the patient's idea of a fit, and are associated with fear. (7) *Hysterical Deafness*. Usually follows upon the inability to hear during a prolonged bombardment. (8) *Visual Disorders*. Complete amaurosis, photophobia and blepharospasm are chiefly seen. (9) *Alimentary Hysteria*. (a) Vomiting. (b) Constipation. (10) *Respiratory Hysteria*. Tachypnea. In these cases there is sudden acceleration of the respiratory movements, usually associated with a marked emotional stage. (11) *Disorders of Sphincter-Control*. This class of patients gives no previous history of incontinence, and responds to treatment by reëducation and suggestion.

In making the diagnosis we have to rely on the absence of those objective signs which characterize diseases in the nervous system: (a) Optic neuritis, optic atrophy, hemianopia; (b) alterations in electrical reactions of muscles and nerves; (c) alterations in the superficial reflexes, *e.g.*, extensor plantar reflex; (d) loss or great exaggeration or inequality in the deep reflexes, such as knee and ankle jerks.

There are also other signs of an organic lesion which are of considerable importance: (a) Babinski's second sign. Combined flexion of the thigh and trunk on the paralyzed side when the patient attempts to rise from the prone to the sitting position, the arms being folded. (b) The pronation sign, in which the hand when tossed assumes a position of pronation. (c) The fan sign. Spreading of the toes associated with the extensor, plantar response, obtained when the sole of the foot is stimulated. (d) The presence of hypotonus, shown by the exaggerated flexion of the forearm on the affected side. (e) The platysma sign, which is shown by the absence or diminished movements of the fibers of the platysma on the affected side when the mouth is open.

The great factor in the cure is an atmosphere of cure. The patient is placed with others who are now well, and one can always count on their telling him of their recovery. According to the degree of the hysterical lesion, direct suggestion, continuous suggestion, hypnosis, ether or intralaryngeal catheterization are used. The treatment, as the author has pointed out, depends largely on suggestion, and it is extremely difficult to describe the routine carried out in each case. The great secret of the treatment lies in the seizing of any signs made by the patient that will serve to suggest a cure, and following it up until the hysterical lesion is mastered. It is always difficult to say how long the treatment will take. Hysteria is a pathological condition caused by suggestion and cured by suggestion.

Bing, R., and Vischer, A. L. THE PSYCHOLOGY OF INTERNMENT.
[Lancet, April 26, 1919.]

These authors contend that any path of life which diverges from the

ordinary, and along which bodies of men are forced to travel, will soon affect the mentality of the men. Under the conditions of prolonged internment a very definite psychoneurosis develops, to which the name "barbed-wire disease" has been given. Three abnormal conditions react upon prisoners of war: The deprivation of liberty; the close herding together; and the uncertainty of the duration of their internment. To these should be added the limitation of all activities and pursuits by strict regulations, and the constant waiting for letters and parcels from home. There is also the fact that the men are cut off from all relations with the opposite sex, which soon makes them prey to their unrealized desires. In spite of a variety of occupations and diversions which are commonly provided, a large number of such prisoners develop a neurasthenia *sui generis*, and in about ten per cent. of all who have been prisoners for over six months the symptoms reach a high level of intensity. The first symptom is increased irritability; the men will not suffer the least contradiction; they become irascible, argumentative, obstinate, and they are characteristically lacking in judgment. They lose the power of concentration to a large extent and become easily fatigued by the slightest effort to concentrate. Very characteristic and striking is the loss of memory of people and places relating to prewar events. Insomnia, diminished vision, the development of suspicious and pessimism, and sexual impotence are among the commoner secondary symptoms. Many of these symptoms diminish or disappear upon change from enemy to neutral internment, but intellectual instability and loss of concentration tend to persist for a long time, and the loss of memory remains very pronounced. In many cases the personalities of the men become radically changed, so that their families find them completely altered, and many of the intellectual men show a decided aggravation in their sensitiveness after removal to neutral internment.

Mercier and Jones. HYPNOTISM, SUGGESTION, AND DISSOCIATION.
[British Medical Journal, May, 1919.]

This interchange of letters is here reproduced, giving an idea of the attitude of two well-known English psychiatrists:

Sir,—How gracious is Omniscience to Ignorance! I put a question to the Universe at large, a question that neither deserved nor anticipated an answer, a rhetorical question, such as Where shall wisdom be found? Where are the snows of yester year? or the question of jesting Pilate—What is Truth? and lo! from the vasty deep of the psychological laboratory of King's College an answer is vouchsafed to me. 'Who,' I asked, 'knoweth not such things as these?' And straightway I receive the authoritative reply 'Dr. William Brown.'

"Light hypnosis, says Dr. Brown, *is* new. So it is—comparatively. There is no record of its use by Esculapius, but then there is no record of the use of any other mode of treatment by Esculapius, so that the

absence of record does not go for much. The comparatively modern Hippocrates does not mention it, nor does the still more nearly up-to-date Galen, but it was used in the eighteenth century by Mesmer as a means of re-associating mental dissociations. I cannot give the reference, which is now dissociated from my personality, or, as we used to say in the Dark Ages before the 'inception' of psychological laboratories, I have forgotten it; but I remember well enough reading an account of the recall of lapsed memories by a patient hypnotised by Mesmer.

"What really *is* new is calling a lapsed memory a dissociation. In psychology, to alter the name of a thing is to make a new and momentous discovery. The method is of German origin, and was received before the war with the reverence accorded to every innovation that was made in Germany respecting mental science; but an uneasy thought crosses my mind—I should say, becomes associated with my personality: Is it after all completely up-to-date to ignore the war and all the lessons it has taught us? It has established beyond dispute the rottenness of German methods and the contemptible minds of the German professors. The theory—or fact—of dissociation did not originate in Germany, it is true, but the ingenious innovation of calling a lapsed memory a dissociation is modelled upon the German method, and is, I fear, not as completely up-to-date as it was twenty years ago—I am, Sir, your obedient servant.

"Parkstone, Dorset, May 12th.

"CHAS. MERCIER."

"Sir,—The readers of the British Medical Journal—even if readers of The Times are denied the privilege of being informed—are among those whose art is guided by 'the fervour and faith and courage of those who toil,' and for this reason they are entitled to know the proper therapeutic value of hypnotism. Although it is not an enviable procedure to interfere in 'family quarrels,' because both disputants have an unpleasant way of turning round to rend the rash person who intervenes, yet I feel that in this instance certainly the truth must lie between two extremes, one of which was expressed by Dr. Mercier in The Times of April 22nd to be 'the uselessness of hypnotism as a method of therapeutics,' and that in consequence he had abandoned the practice. After explaining that Charcot often employed light hypnosis, Dr. Mercier added, in The Times of April 25th, that 'no patient of mine has ever received any benefit from hypnosis'—a very definite, positive, and categorical statement. The other extreme was expressed by Professor William Brown in The Times of April 26th, when he stated that the condition of light hypnosis allows the physician to recall certain emotional memories with great vividness, this recall effecting cures in hundreds of consecutive cases, and which, so far as could be ascertained to date, proved to be permanent recoveries through the aid of hypnotism.

"I should like to add that my own experience in the main supports

Dr. Mercier's, because I have had occasion to use hypnosis mainly for the psychoses—that is, for mental cases whom it has failed to relieve; but I have watched its use, and have also to a limited extent practised it myself, in the neuroses, with what I can only describe as marvellous results. I have, as its effects, seen the dumb speak, the blind see, the maimed and the halt made whole, and stammerers cured. Herein lies the difference between results under these two eminent authorities; Dr. Mercier, with a wide reading, a wealth of knowledge, and practical experience, refers mainly to mental cases—which his practice has naturally included and covered; whereas Professor William Brown, with an equally full knowledge, guided by a complete acquaintance with the literature of the subject, as well as by its practical application, refers to the neuroses, in which mental dissociation or repression, or whatever the condition may be—and this is uncertain—is often dependent upon one overwhelming emotion; it is temporary, and it is far less marked than it is in the psychoses; so that, although there is no definite line of demarcation between them, yet the 'mind'—the attention and feeling, cognition, and conation—is able to work with the physician in the one, whilst it cannot be seized or held in the other.

"The two conditions are not really comparable, although the one may merge into the other; yet throughout the war all the psychoses have been concerned, as 'hospital' cases, and wisely so; and they have had the advantage of the newest practices and methods of the physician psychologist, but it must not be assumed that the practice of the psychiatrist in another field must be scrapped, or that it is useless and out of date. The treatment of the neuroses and psychoses has been most successful during the war, because they have come under treatment early, even within a few hours of the onset of symptoms, and it is the similar application of this early treatment that is now anxiously awaited for the civilian.—I am, etc.,

London, S.W., May 12th.

ROBERT ARMSTRONG-JONES.

Watson, A., and Meighan, J. S. FUNCTIONAL PARALYSIS OF THE DIAPHRAGM. [British Medical Journal, March 15, 1919.]

These observers say that attention has recently been directed to the rapid, shallow type of breathing found in late cases of gassing.

The condition has been associated by Haldane with an exaggeration of the Hering-Breuer reflex. The condition has also been observed in patients in whom nervous symptoms developed as the result of shell shock. Two cases are recorded in considerable detail, both patients showing a marked acceleration of breathing, the rate varying between 50 and 80 a minute, associated with considerable subjective dyspnea. Careful study served to eliminate any pulmonary condition or infection as the cause in either case, but respiratory tracings taken simultaneously

from the chest and the abdomen showed quite distinctly the presence of paralysis of the diaphragm which was believed to be due to a functional disturbance of the centre of the phrenic nerves. In one of the cases the tachypnea persisted throughout sleep, while in the other the respiratory rate fell to about normal when the patient was asleep.

WAR NEUROSES. [British Medical Journal, Ap. 12, 1919.]

The meeting of the Medical Section Mott introduced the subject of war neuroses. He was followed by Hurst, who gave an analysis of the various emotional neuroses and added some results of his experiences at the Seale Hayne Hospital. The general trend of his observations was to show the preponderating part played by hysteria in the production of war neuroses; the test between organic and functional nervous disease should be the response to psychotherapy, and he had found that patients with such suggestive symptoms as urinary incontinence, constant vomiting, constant headache, and recurrent fits might all be suffering from functional disease, whether primary or secondary to cured organic nervous disease. He held most cases of epilepsy in soldiers to be functional. For treatment he advocated explanation and reëducation, making the patient take an active part in his cure. Farquhar Buzzard laid stress on the similarity of the neuroses of peace and war, adding that those of war were easier to treat because their etiology was the more uniform. He proceeded to draw from experience in war lessons of value for peace, advising that the Minister of Health should institute both prophylactic and remedial measures—the training of medical officers to deal with neuroses, the provision of out-patient clinics and a larger number of institutions for its treatment—and he described labor unrest as the war neurosis of a community. Purves Stewart devoted himself to pointing out the importance of accurate clinical diagnosis and the clear definition of terms when dealing with that ill-named complex “shell shock”—a term never to be employed again; he gave a classification of neuroses into eight groups. On all hands the frequent occurrence of neuroses in the present war had excited comment; in previous wars our men had been trained and seasoned soldiers, and he expressed surprise that the number of cases of neurosis occurring in our armies during the last five years had been relatively so few. Dr. Yealand gave an account of his work in the National Hospital in Queen Square, and took the opportunity to decry the use of hypnotism and methods of psychoanalysis in the treatment of war hysteria, for the reason that so many patients thus treated arrived later for further treatment in the out-patient department of that hospital. Dr. Johnston gave an admirable account of his treatment of many thousand cases of war neurosis at a specialized casualty clearing station in the front area, and stated that only 1 per cent. of our men fighting about Passchendaele between August and October, 1917, went sick as cases of neurosis. He

described the methods of treatment adopted, emphasizing the importance of a healthy moral atmosphere, the segregation of the patients, and the inception of the appropriate treatment as soon as possible. Dundas Grant spoke of the difficulty of distinguishing organic from functional disease of the ear in many cases of neurosis, and said that he had met with very few cases of simulated deafness. Details of the elaborate system of dealing with cases of war neuroses in the American fighting forces were given by Zabriski and Hamilton; and M. Macdonald gave an interesting analysis of the possible etiology of the contractures seen in patients with war neuroses. Ormond gave an account of some interesting ophthalmological cases in which the diagnosis between functional and organic disease was obscure. Lumsden laid stress on the importance of following up cases of war neurosis supposed to have been cured, and deprecated the use of the term "cure" until the passage of years justified it. Prevention of relapse was what the sufferers wanted rather than the removal of their neurotic symptoms; the epilepts and borderland mental cases were, in his experience, the most difficult to deal with. Holmes, speaking from two years' study of war neuroses in France, described the results of treatment of the functional cases as unsatisfactory on the whole, adding that at the present moment no fewer than 36,000 war-neurasthenic patients were awaiting reëducational treatment. Beaton said that hysteria had never got a footing in the navy, in which cases of neurosis had been rare. Culpin spoke in favor of the use of psychoanalytical methods in the treatment of patients with war neuroses.

Naville, F. HYSTERIA OR PITHIATISM? [Rev. Méd. de la Suisse Romande, January, 1919.]

Babinski's doctrine of pithiatism which he has been teaching now some 10 years, without change, is criticized by Naville. He illustrates his points by the history of a girl of 15, who for several years had been having convulsions, frequent and prolonged narcolepsy, intermittent chorea, occasional slight mutism and functional paraplegia. She also had insomnia, nightmare, vertigo, paroxysmal headache, anorexia, tremor pains, tachycardia and functional disturbances in vision, in short, a major hysteria of the old type. An emotional shock seven years before appeared to be the starting point. It had been totally forgotten because it had been thrust into the unconscious sphere by the initial crisis. As soon as this emotional traumatism had been brought to consciousness, the symptoms cleared up and the functional symptoms improved. The emotional shock was the disappearance of a young brother and the news which was not true that he had been run over by an automobile. The girl has been completely cured during the year.

Rivers, W. H. PSYCHIATRY OF THE WAR [Science, Ap. 18, 1919.]

Because physicians who treat mental cases and those who treat

nervous diseases have been called upon to deal with the large number of cases of psychoneuroses which the war has brought about, each group has become more closely affiliated with the other. Shell-shock was a term used at the beginning of the war to express the physical effect of shell explosion, but later on it was found that the effect on the soldier was essentially mental. The war has not only proved that mental factors are important, but that certain kinds of mental processes are especially to be taken into consideration, namely, those of emotion and instinct. Striking effects, both mental and physical, have been produced in consequence of war experience among patients; and as a result, psychotherapy has taken its place among the resources of the profession. But there is still a wide difference of opinion with regard to the value of this form of treatment; and although a mental analysis which closely resembles the theory of Freud has been successfully used, it does not go as deeply into the unconscious as that of Freud. The general attitude towards Freud's doctrine had not been a friendly one on the part of the medical profession, but it has become much more sympathetic and understanding. The influence of the war upon psychiatry in Great Britain, Rivers writes, has been very great. It has also been the case in other countries, and it is thought that with the knowledge already acquired, the large amount of added experience will have considerable weight in bringing about an agreement between psychologists and the medical profession in the treatment of psychoneuroses of civil life.

Milligan, W. WARFARE INJURIES AND NEUROSIS. [Proc. Roy. Soc. Med. Laryngol., Sec. VIII, 109.]

In injuries of the nose and nasopharynx the immediate anxiety has often been the arrest of hemorrhage and the remote how best to restore function and appearance. For hemorrhage about all that can be done is to plug up from the front. In comminuted injuries of the framework of the nose the maintenance of a free passage and the prevention of adhesions has presented difficulties. As an effective splint, the finger of a rubber glove packed with gauze may be used.

Injuries of the larynx are rare. In one case perichondritis occurred requiring tracheotomy. Warfare neurosis is very common. The writer reports case of left recurrent paralysis from bullet wound of face, the bullet being imbedded in the body of the second vertebra. The fibers of the vagus which go to form the recurrent were doubtless injured. Another case, bullet entering just below and behind the lobule of the ear, traversed the skull and right eye. The cribriform area was so badly damaged that complete anosmia resulted. Nine or ten cases of deaf-mutism from shell-shock all recovered in six weeks. Abrogation of function was due to temporary suspension of neuron impulses from the higher cortical centers to the periphery. Many of the ear neuroses occurred in those previously affected with ear disease, which might make

one believe that they are due to peripheral rather than central disturbances.

Pellacani, G. PSYCHONEUROSES OF WAR. [Rif. Med., Feb. 8, 1919.]

Pithiatism, in Babinski's sense, forms a part of hysteria, the author thinks, but that it is not all hysteria. This is particularly evident in the war psychoneuroses. The essence of hysteria is the psychogenesis of the symptoms, and the essence of the psychogenesis is the susceptibility to suggestion. There is a great necessity for drawing a sharp line of distinction between the trauma set up by the emotions, and that which Babinski so superficially calls suggestion, but never explains what suggestion really implies. Living beings are surrounded by a million suggestive possibilities, why this or that or another is seized upon, Babinski never attempts to explain.

Ishigami, Tohru. THE PSYCHE AND TUBERCULOSIS. [American Review of Tuberculosis, Oct., 1918.]

Ishigami has presented the result of his observations and experimental work on the opsonic index in tuberculosis to determine the influence of psychic states upon this disease. He calls attention to the several spheres in which experimentation has already proved an unmistakable relationship between psychic states and their varying conditions and physiological functioning. This was first noted by certain observers and then more definitely confirmed by such workers as Pawlow in the case of gastric secretion, Cannon and his fellow workers in regard to the adrenal secretion and the movement of blood sugar, and others who have demonstrated these effects and the innervation through which they are accomplished.

Ishigami himself has worked for a number of years to determine first the relationship of the opsonic index to the progress of tuberculosis and the influence of psychic states upon the opsonic factor. He has found that in advanced tuberculosis this index is lower than in the less advanced stages of the disease and that treatment raises the index. In untreated cases a higher index is shown where the prognosis is favorable; a fluctuating index accompanies an unfavorable prognosis. He finds, further, that change in the index is to a great extent dependent upon the mental condition, anything that causes anxiety or depression at once lowering the opsonic index which again rises when the mental depression has passed. If the cause of worry is prolonged, a "cumulative negative phase" persists. Moreover, certain patients, in spite of extensive local manifestations and the presence of many microorganisms, show a comparatively high opsonic index and proceed favorably. These are an optimistic type of patients who do not easily yield to worry. In chronic cases progressing fairly well, the opsonic index may be suddenly lowered by sudden misfortune and the disease will at once

take an unfavorable turn. In order to place these observations upon a more exact basis the author performed a number of experiments, supplementing urinalyses made regularly upon the patients, to determine the physiological pathway by which psychic events produced this definite effect. It was shown that glycosuria was frequently present in advanced cases, particularly in nervous subjects. It was demonstrated also that glucose and adrenalin have an inhibitory action upon phagocytosis in general, this being particularly confirmed in the case of consumptive patients, and that in the less severe cases the phagocytosis was still present to a more marked degree than in the more advanced ones. The writer believes that this represents the overstimulation through psychic conditions of a normal compensatory mechanism which Cannon has described, whereby through an increase of adrenalin output and increase in blood sugar the individual is prepared for sudden emergency. Here the stimulation, set in motion by the psychic reasons playing upon the patient, cause an increase in these products in the blood, for which there is no adequate opportunity for utilization, and they therefore remain to affect the lowering of the opsonic index, of which they have been proved capable. Other disturbances of physiological processes, such as interference with the digestive function, are at the same time psychically initiated, which aid in the deterioration process. It is interestingly noted that in Japan, from which this report comes, tuberculosis is especially prevalent among those of school age and among primary school teachers. This fact the author attributes to the inadequacy of prophylactic measures during the school age, the peculiarly heavy strain attendant upon linguistic difficulties and the didactic method of teaching, and the severity of examinations, beside the severe living conditions for which only low teaching salaries are provided. Mental strain on the part of both teachers and pupils favors the spread of infection from one to the other. This report of these very important observations and studies has maintained itself on the strictly conscious levels of the more obvious play of psychic factors upon these essential physiological processes. It is only from these as a starting point that the intimate relation of psychic and physiological processes can first be established, but it should awaken medical thought to the fact that this, after all, is the approach to a larger field of much responsibility and much fruitful result for the future, prophylactic as well as curative, as the author suggests it from the more obvious point of view. There are unfathomable depths of psychic activity where unconscious psychic factors are operative, with a force that has scarcely begun to be measured, in the lives of each individual. The avenues that are being opened into their recognition and study present a fascinating possibility of approach to the treatment of tuberculosis on the psychic side as well as toward a prophylaxis through a strengthening of psychic health and resistance. The value of this can be estimated only through the patient and determined coöperation of future physiologists and psychologists.

Austregésilo, A. CATAPHRENIAS. [Semana Medica, Buenos Aires, Sept. 19, 1918, 25, No. 38, p. 365.]

Austregésilo defines cataphrenia as a state of mental debility of the dementia type, differing from dementia, in that it may retrogress allowing complete recovery. Diagnosis in a number of patients of this type varies between dementia præcox, chronic mental confusion and manic depression, and insanity of the confusional or stupid form. In from six months to three years the marked improvement or complete cure made him revise his theories as to the nature of the psychosis. A few cases, of young men and women, are described, illustrating this acquired psychic abnormality which may retrogress or may progress to actual dementia præcox, chronic mental or catatonoid manic-depressive insanity.

Naville, F. MENSTRUAL PSYCHOSIS. [Revue Médicale de la Suisse Romande, Geneva, Oct. 1918, 38, No. 10, p. 591.]

A case of "dream delirium" where the erotic element was accompanied by melancholia, ideas of suicide and a tendency to mania. A young woman, of the microcephalous type, with a tendency to migraine and dysmenorrhea, was unable as a child to keep up with her mathematics. Care should be taken not to regard every acute mental incident in a person naturally below par or a psychopath as a necessary indication of a psychosis with a progressive course such as dementia præcox. In this case the regulation of menstruation and other functions was soon followed by subsidence of the psychosis, in the young woman, who, although still childish and emotional, has had no recurrence during the six years to date.

Naville. DREAM DELIRIUM OF A DEBILE IN A MENSTRUAL PSYCHOSIS. [Rev. Med. de la Suisse, Romande, Oct. 20, 1918.]

Lasegue originally described this affection in 1881 under the name *Delire de Rêve*, and by Regis in 1894 as *Dream Delirium*. Occurring in various mental states, and recently much studied by Freudians, it has not often occurred in true psychoses. The patient was a microcephalic debile. Apparently a case of frank hebephrenia, the subject recently employed as a chambermaid, developed the psychic symptoms rapidly. Of average capacity she possessed common sense and a good disposition. The attack beginning with a menstrual period, was associated with habitual dysmenorrhea and migraine. Her periods even before a truly pathological state had developed, were marked by irregular behavior, which came to a paroxysm in insane acts of self accusation, and she was committed as irresponsible. Insight came after internment, although the true mental defect became evident in her evincing the motor celerity of the microcephalic. Occasional continuous laughter was followed by the peculiar dream state when, after a night-

mare, she revealed much of her past. These dreams also bothered her in the day time. As her periods became less painful she improved and for four years has been comparatively well.

Leuba, Jas. H. ECSTATIC INTOXICATION IN RELIGION. [American Journal of Psychology, Oct., 1918.]

Drug intoxication and the higher mysticism are closely related; and drugs are commonly employed by uncivilized peoples in religious ceremonies. The negroes of the Niger have a fetish water, the Mexicans the peyotl, the Hindoos their hemp, etc. Rhythmical bodily movements yield similar results, as is seen in revival meetings. Even now when intoxication is no longer considered union with the Divine, it inspires the poet and the orator. This, Leuba thinks, is because it satisfies certain deep biological demands: it brings deliverance from fatigue, restraint, and tension, and creates a sense of unlimited possibility and exhaustless energy. Here then is the significance of the idea that in ecstasy man communes with the gods.

Pollock, H. M. A STATISTICAL STUDY OF 164 PATIENTS WITH DRUG PSYCHOSES. [State Hospital Quarterly, New York, Nov., 1918.]

Pollock studied the first admissions of patients with drug psychoses to the thirteen civil State hospitals of New York during the period beginning October 1, 1909, and ending June 30, 1917. Pollock draws a number of conclusions from this study, of which the following are of especial value: Only a small part of the total number of drug addicts develop psychoses. Opium and its derivatives were the principal drugs used by the patients studied. About five and a half per cent. of them die within one year of the date of admission and about seventy per cent. recover in the same time. Approximately nine per cent. of the drug cases discharged are readmitted.

4. FORENSIC PSYCHIATRY.

Price, G. E., and Terhune, W. P. FEIGNED AMNESIA. [J. A. M. A., Feb. 22, 1919.]

A number of cases of soldiers feigning loss of memory to escape punishment have been observed in the work of the Provost Marshal in Paris. In every case the charge was absence without leave, and in no case was loss of memory attributed or alleged to escape duty at the front. The individuals were all of more intelligence than the average: one was a captain, two were first lieutenants and the rest were privates. Some deemed it wise to remember nothing of their past lives, others limited themselves to more recent incidents, while the majority claimed an amnesia corresponding to the period of their misdemeanor. Several instances are reported. In most cases the malingering was easily ex-

posed by inconsistencies in the patient's statements. The mechanism of the reaction is easily understood. The soldiers have heard of shell shock, and are inclined to give this as an explanation. The condition is important only because of the possibility of its being confused with cases of true amnesia. The chief conditions to be differentiated are hysteria and confusion from exhaustion, a case of which is reported to show the difference. The following are the authors' conclusions: "1. Feigned amnesia has assumed a place of importance in psychiatry because of the tendency of many examiners to classify it as amnesia due to hysteria. 2. The condition is a defense reaction to escape punishment. It is not unfamiliar to civil practitioners engaged in medico-legal work. 3. Amnesia, when alleged in industrial circles, may be of similar feigned character, for the purpose of gain. It is encountered in this case due to the expectation of compensation. 4. The dissemination of misinformation about 'war neuroses' under the title of 'shell shock' is to be regretted. The popular idea regarding this condition is erroneous, owing to the premature and inaccurate descriptions published. This has in turn been responsible for a larger incidence of the disease in the army than is justified, and has also enabled men to seize on it for an excuse for misdemeanors."

Clark, L. P. A PSYCHOLOGICAL STUDY OF STEALING IN JUVENILE DELINQUENCY. [N. Y. Acad. Med. Ped. Sect., Ap. 11, 1918; Med. Rec., Mch. 15, 1919.]

This paper made no attempt to consider the so-called benign types of ordinary stealing, nor was emphasis placed on fanciful stealing, such as the kleptomanias. On the whole the main characteristics of the persons here considered were stealing money and consciously committing other antisocial acts of a petty sort, mainly as a consequence of having no well-grounded sense of property rights. Usually these individuals showed predominantly many other poor adaptations to authority and law from earliest life, or they appeared unable to grasp thoroughly the importance of making the proper submission and compromise with parental discipline. There were some investigators who looked for the root of these trends entirely in the make-up of the youth himself, accounting him either a moron, a subinhibited mental defective, one antisocially inclined, or a psychopathic inferior, whatever that term might mean. Others greatly favored the idea that the parents or home environment were largely responsible for the development, if not for the actual implantation of the unruly or immoral traits of character. Usually neither group failed to indict the family stock for the delinquents found. When one undertook to investigate a series of such youths he was impressed by the fact that there were many more subtle forces at work than those usually obvious on the surface. Healy, in his investigations of mental conflicts and repressions in delinquent children,

analyzed the acts of stealing money to sex delinquency and the incomplete mastery of the latter. In a long series of cases he found surprisingly often concealed sexual conflict as well as defect in parental discipline and lack of proper filial-parental relations. However, he mentioned no case in which antagonism to the father and desire for childish revenge upon this parent was the cause for stealing. Such a case was recently seen by the writer. This was a boy who for several years had stolen and played truant from school. The mother herself had become embittered because of her marital troubles and had gone to live with her mother. The boy stole so much from the grandmother and her immediate family that the mother had to take him elsewhere. The boy's great fault was in concealing his thoughts and daily activities from the grown people. After the more obvious faults in his home and school life were set right and the boy was permitted certain liberties and pleasures, his conduct improved, yet he still lied and was sly. A frank talk with this boy showed that he failed to make any good compromise with discipline and authority. Clark related several similar instances and also cases in which the delinquency was more complicated and seemed in part due to inability to adjust properly to the revolt at puberty. In one case the cause seemed to lie in a latent homosexual complex. From a study of these cases the writer believed that one might fairly infer, when the act of stealing occurred without apparent motive, at least sufficient for the offense as ordinarily found, that it was probably unconsciously conditioned upon either a defect in adaptation to authority, to sexual conflict and repression at puberty, or it was a vicious homosexual theft substitution for the offender's own sex. The line of therapeutic procedure was obvious in all these cases, that was, explanation by analysis, conscious guidance, and a sympathetic after-care and training. The enormous demand and difficulty of sublimation in the homosexual victim of the theft habit made correction extremely difficult. In fact it was to be doubted whether the homosexual was ever able to sublimate sufficiently to keep him from social conflicts or from a neurosis more or less dominant through his life. One could not too forcibly insist upon the importance of studying the child's adaptation to parental authority when delinquency began at a very early age as a basis for adjustment to all law and order in the future life of the individual. Sufficient data were at hand to warrant the statement that in the infant mind one of the earliest conceptions of reality was impingement of its desires by the parent. The magic signals of crying and gesture did not move the parent to gratify the child's wish. In the persistence of this feeling of unrequited longing no doubt the child began to scrutinize with increasing wonder the reason for noncompliance on the part of the parent, and more or less rapidly interpreted it in terms of selfishness or the self-satisfied possession of things and powers which enabled the person calmly to resist the child's frantic demands. Soon

the parent's belongings were taken as symbols of the parent's potential self-sufficiency. It was not a far step to the further exercise of power for the child's satisfaction in gratifying his personal appetite in stealing fruits, or committing forbidden excesses which he believed the parent had unrestricted opportunities to enjoy. This seizing of the parental power and privilege advanced to new forms of covetousness and conquest, namely, that of possessing the magic symbol, money. In conclusion, it might be said that, even when the child's defective adaptation to authority and property rights were made clear, there were possibly other and still more genetic reasons for this early conflict, namely, the latent infantile desire to usurp the place of the father and all its possible prerogatives. While one need not neglect the study of the adult life of criminals, and especially the causes of recidivism, even there the adult pattern of the antisocial acts would probably be found to embrace in greater part the distorted mechanism of the primary life fault of early life. Clark, in closing, added his suggestions to those of Healy and Glueck to the end that the intensive study of antisocial behavior of the juvenile delinquent might enable us to correct not a few such faults before a fixed formation of habits and character had rendered the offender so hopeless in adult life.

Bluemel, C. S. MORPHINE HABIT. [Journal A. M. A., Feb. 22, 1919.]

The author says that the immunity to morphine in the addict, who can take much larger doses, has led physicians to believe in a specific antibody to morphine in the blood, which, unneutralized, is the cause of the withdrawal symptoms. Whether such antitoxin or autotoxin is present, it is evident that some form of toxin exists and the withdrawal symptoms of sweating, vomiting and diarrhea would indicate that the body is endeavoring to eliminate it. At present the treatment of morphinism involves three principles, namely catharsis, rapid or gradual withdrawal of the drug, and the use of the various belladonna products, most generally scopolamin. Under any form of treatment the patient suffers somewhat, and the drug used may cause delirium. The Towns-Lambert, Sceleth and Petty treatments are described. It is difficult to determine the value of the belladonna, but Bluemel thinks that suggestion has something to do with its effects. He does not deny the value of the method, but his own faith is largely in the eliminative treatment, and it occurred to him that this could be greatly augmented by the intravenous injections of physiologic salt solution, thus producing elimination through the kidneys and intestines and also diluting the toxins in the blood. On these theoretical considerations, the author decided to attempt the treatment of chronic morphinism solely by elimination and describes his treatment as follows: "The patient is put to bed and his morphine stopped entirely. He is put on a semisolid or liquid diet, and is given cathartics as prescribed in the Towns-Lambert treatment. He

thus receives three or four cathartic courses, consisting of 5 grains of blue mass with five compound cathartic pills, at intervals of approximately eighteen hours. Some hours after the last of these cathartic courses he is given castor oil. The patient receives from two to four intravenous infusions a day according to his condition. The standard infusion consists of 1,000 c.c. of 0.9 per cent. sodium chlorid in sterile freshly distilled water. During the first few days of treatment the patient is given enough chloral, usually about 30 grains, at bedtime to insure a night's sleep. Hypnotics are an important element in the treatment, for the sleep they induce not only blots out large periods of discomfort, but also fortifies the patient mentally and physically for the ordeal through which he is passing. The semisolid or liquid diet is continued as long as the patient feels any nausea, and he is kept in bed during the cathartic period and until all acute discomfort from the withdrawal of the morphine has disappeared." In all cases, the morphine is stopped at once, and if the patient complains unduly, a saline solution is given instead of morphine hypodermic. There seem to be no contraindications to the saline treatment. The injections do not increase arterial tension markedly, or cause anemia. The viscosity of the blood is decreased, reducing the heart load, and permitting the administration of larger doses of chloral. It was not found necessary to give cardiac stimulants. Six patients were thus treated. The average duration of addiction was twelve years and the average daily dose of morphine was 7 or 8 grains. The average stay in the sanatorium was fourteen days, the infusions being given the first seven; the average total amount being 15,600 c.c. per person. Some withdrawal discomfort was experienced for the first few days, but never excessive. Considerable relief was received by the majority from the intravenous infusions. After the first discomfort was over, there was some nervousness and sleeplessness manifested occasionally. The average patient took hypnotics for only four nights. Two patients were given, during the restless period, the Towns-Lambert treatment without morphine and improved under it. Both had been addicts for more than twenty years. Bluemel thinks that their confidence in this method which was known to them, assisted in the improvement observed. A simultaneous series of six patients was treated with the Towns-Lambert method, small doses of morphine being given as called for. They were milder cases, their average dose being $3\frac{1}{2}$ grains, and their average duration of addiction nine years. With this combined treatment the nervousness disappeared more quickly. It would seem that the infusion treatment, combined with the other, might be advisable, but a larger series of less dissimilar cases would be needed for proper comparison. Brief reports of the individual cases are given. In conclusion, Bluemel remarks on some of the broader aspects of morphinism, and suggests to relieve some of the suffering caused by the Harrison Act, licensing some chronic addicts to receive their regular dose

from some Government-authorized physician would be merciful and would help to cure the illicit dealing in narcotics, which tends to increase the number of users. Curing them, however, would be a still better alternative.

Gautier, P. POISONING FROM BARBITAL. [Rev. Med. de la Suisse Romande, Nov., 1918, 38, No. 11, p. 641.]

Four cases of self-administration for unknown purposes are here reported in which 3.5, 5, 7 or 8 gm. of diethyl malonyl urea (veronal) had been taken. One woman of 33 died after four days of coma and hyperpyrexia; the dose had been 75 grains. Necropsy revealed congestion of the brain and the bases of both lungs. Those taking this drug habitually seem less able to stand moderate doses than others. Death has occurred from a 45 grain dose in an addict. Treatment can be only symptomatic. Gautier protests against the unrestricted sale of barbitol, particularly as it is liable to lead to morphine and other drug addiction.

Anderson, J. T. INSANITY IN WESTERN AUSTRALIA. [Med. Jl. Austral. May 24, 1919.]

The report of the Inspector-General of the Insane for Western Australia, for the year 1917 commences with a plea for more accommodation for the mentally afflicted. The Hospital at Claremont was so overcrowded during the year that some of the patients had to be transferred to rooms intended for the staff and beds were placed in various situations not intended for sleeping purposes. Dr. Anderson points out that the delay in providing additional accommodation has been occasioned by stringent financial conditions, but he maintains that the matter has become so urgent that a start should be made forthwith.

During the year 1917 the Mental Treatment Act became law. This Act provides for the admission into a hospital for the insane without any order or certificate under the Lunacy Act, of persons who have been on naval or military service and who are suffering from war strain or mental disorder of recent origin. The admission follows on a request signed by a responsible military medical officer. The segregation of military patients in a suitable house at Cottesloe Beach was under consideration at that time. Since the publication of the report, this proposal has been carried into effect. The number of attendants who had enlisted up to the end of 1917, was 76. Eleven had died on active service, three had returned and resumed their duties, while 62 were still away. The Hospital authorities had engaged 10 returned soldiers for various positions. The policy followed is to appoint a returned man, if one be available and, if not, to give preference to applicants who have been rejected for military service. The total number of insane persons in the State on the last day of 1917 was 1,067. One of these persons was in a private mental hospital, seven were at the Whitby Falls Hospital for

the Insane, while the remainder were at the Claremont Hospital. The number represents an increase of 21, as compared with the previous year. The proportion of the insane to the sane in the community was 4.74 per cent. for males and 2.09 per cent. for females, or 3.44 per cent. for the whole community. In 1902 the proportion was 1.73 per cent. The rate has increased steadily year by year. A comparison is made between the various Australian States in this connection. In Victoria the highest rate obtained in 1917, while the proportion was lower in New Zealand, Queensland, New South Wales, Western Australia and South Australia. In 1903 the order was the same, save that the rate was higher in Queensland than in New Zealand. The total number of persons admitted during the year was 165. The proportion of admissions to general population was one to 1,875. The admission rate had varied considerably during the 16 years. It was highest in 1909 and lowest in 1917. In the same year the admission rate in New South Wales was one to 1,434, in South Australia was one to 1,541, in Queensland was one to 1,547, in Victoria was one to 1,792. Of the 165 persons admitted, 15, or 9.09 per cent., had previously been in the institution. The re-admission rate had varied between 6.66 in 1910 and 12.50 in 1906. During the course of the year 86 persons died in the institution and 66 were discharged. Of these, 38 had "recovered," 17 had improved and one was not improved. We presume that the term recovered signifies the disappearance of the manifestations of mental disease, rather than its actual cure. Alienists have a curious method of recording the frequency of recovery by expressing the number as a percentage of the number of admissions in the same year. The advantage of this figure appears to be that a comparison can be made. The disadvantages are obvious. The percentage of recoveries to admissions was 23.03. In the year 1902 it was as high as 51.74, and although it had fluctuated considerably during the intervening years, it had never reached so low a figure as it did in 1917. It is impossible to attach any particular significance to the small number of apparent recoveries at all events from the data contained in the report. Among the predisposing causes of the disease in those admitted during the year, ill-health, worry and overwork are mentioned under the heading "moral" as having acted in nine cases. Under the heading "physical" heredity appears 40 times as a predisposing cause, alcohol appears 37 times as an exciting cause, senility 28 times as a predisposing cause, venereal disease 12 times as a predisposing cause and epilepsy nine times as an exciting cause. The usual inclusion of previous attacks among predisposing causes is made in connection with 15 of 165 cases. It is obvious from this table that very little information is available concerning the cause of insanity in these 165 persons. In regard to the form of disease, it appears that delusional insanity occurred 38 times, melancholia 23 times, confusional insanity 20 times, senile dementia 18 times, idiocy and imbecility 13 times,

general paralysis of the insane 13 times, *dementia præcox* 7 times, acute melancholia 6 times, ordinary dementia twice and various less defined forms in the remaining five patients. Five of the patients admitted were under 15 years of age, while 28 were between the ages of fifteen and thirty-five years of age. There were 47 between the ages of thirty-five and forty-five, 40 between the ages of forty-five and sixty and 24 between the ages of sixty and eighty-five. The age of three patients was unknown. The ages of the patients discharged "recovered" varied between fifteen and sixty-five, while, of the others, the range was slightly larger. Two of the patients discharged had been under treatment for under one month; five had been in the hospital between one and three months, eight between three and six months, 11 between six months and one year, 13 between one and two years, 19 between two and twelve years and two over twenty years. The total number of patients admitted to the Hospital under the Inebriates Act, 1912, during the year, was 34. There were 18 patients on the last day of 1916. Of the 52 patients, 37 were discharged during the year and 15 were still under treatment.

Obituaries

HIPPOLYTE BERNHEIM

The passing of this well known figure from the active field of medicine marks an important event in neurological history. The life and work of Professor Bernheim was so closely bound with the establishment of psychotherapy upon a scientific basis and so associated with its progress that one cannot be considered without the other. And to this progress his earnestness, exactness and determined seeking after the truth lent a breadth and solidity that served to make the advance a real one. He built carefully as he went and did much to pave the way for the entrance and establishment of the continually broader and newer methods of penetration into psychotherapeutic problems and applications to them, which continue to mark the course of psychopathology.

It is not that he espoused each such new introduction into this his field of work. He was a man of the older school, but as such his work was progressive, always in advance and based upon a careful gathering of facts from his clinical practise and the consideration and interpretation of these in the light of a psychological and philosophical mind. Born in Alsace and a pupil of Mathieu Hirtz he was early associated with him upon the faculty of Strasbourg. Here he already displayed the qualities which always distinguished his work, clearness and accuracy of observation, and a careful logic in making use of these facts. These characteristics marked his early work of teaching as well as that of later times and impressed themselves upon his published work.

He succeeded Hirtz in 1872 upon the faculty of the School at Nancy, of which he was made titular professor in 1879. It is here as leader of this famous school that his name is best known. He took up the work which Charcot had initiated in the field of psychotherapy, particularly with hysteria. He was drawn to the researches of Antoine Liébeault, who was utilizing hypnotism in the treatment of hysteria, and with him Bernheim worked, pressing further into the explanation of the phenomenon of hypnotism, which Charcot had already partially defined. Bernheim laid emphasis upon the part which suggestion played, autosuggestion on the part of the patient and largely unconscious counter suggestion on the part of the physi-

cian. He believed that the stigmata or the peculiar morbid state which Charcot ascribed to the hypnotizable subject consisted only in this. He recognized this hysteric condition as merely the exaggeration of a natural psychomotor state which was subject to occasions of unusual excitation or lack of inhibition. This he considered an indication of temperament rather than a disease, and believed that it was always accessible to proper treatment.

In all this he was in a stimulating controversy with the leaders at the Salpêtrière, one which was productive of continued advance in clearing this important field. He himself said of the controversies which his teachings occasioned that he believed his opponents would come to the truth and that time was always his best advocate. In his later use of suggestion he discarded hypnosis, believing that suggestion in the waking state was sufficient. He was always interested in discovering in the factors underlying the patient's condition the influence of the past as well as of the present. He approached these individual psychic problems with that same sense of the unity of existence which marked all his own thought and work.

His work as a teacher was always based upon actual clinical contact and was carried on largely in the presence of his clinical material. His accuracy, precision, and faithful attention to details were combined with a great volume of accumulated knowledge, to which his studies and his experience continually added, and with a striking lucidity of thought and a profundity of philosophical appreciation. All this made of him a sure diagnostician and created a forcefulness to his teaching and writings. He has published the results of his studies at various times. His first publication was in 1886 in regard to suggestion and its use to psychotherapy. "*Hypnotisme, suggestion et psychothérapie*" has passed through three editions. It has since been succeeded by "*L'Hystérie*," published in 1913, in which he discussed the conception he held of hysteria, its pathogenesis and the application of psychotherapy to it. Beside other writings he has left a psychological work still to be published, "*L'Automatisme et la Suggestion*," which has been presented to the academy of moral and political science.

The latter years of his life were spent in failing health, but he continued at his studies in medicine and in philosophy, his pen remaining active to the end. He was keenly interested in the functional psychic disorders of the war, although unable to take a directly active part in their service. His death occurred in February, 1919, at the age of seventy-nine years.

SMITH ELY JELLIFFE

IN MEMORIAM

DR. ALLAN M'LANE HAMILTON

Died November, 1919

MINUTE ADOPTED BY THE NEW YORK PSYCHIATRIC SOCIETY,
JANUARY 7, 1920

DR. CHAS. L. DANA

Dr. Allan McLane Hamilton was a pioneer in and an important contributor to neurology, legal medicine, psychiatry and to American letters.

He wrote a textbook on electro-therapeutics and one on nervous diseases. He edited an encyclopedic system of legal medicine, wrote a work on railway and other accidents and prepared a very useful clinical guide entitled types of insanity. These works and his numerous shorter but important and helpful contributions, always along progressive lines, give him a permanent place in the history and development of the sciences to which he devoted his career.

His biography of his grandfather Alexander Hamilton, and his own autobiography are important historical contributions. His own autobiography is an especially interesting human document.

Dr. Hamilton's scientific attainments were combined with an alert, active and inventive mind. He was besides, a man of fine and varied artistic gifts. These, with charming personal and social qualities, won him many friends and attached to him a very large group of persons who loved his society and who appreciated his unusual talents and widely ranged experiences. He had a quick, intuitive intelligence and appraised his fellowmen with skill and finality.

He was generous and kindly and gladly helpful to those of his younger associates whose merits he, an acute and discerning judge, correctly measured.

His activities in connection with the origin of the New York Psychiatric Society, of which he was the founder and first president, place that organization forever in his debt.

This memorandum is inscribed upon our records so as to express permanently our obligation, and also our appreciation of his character, career and services.

In his death we have lost a man of rare intelligence and many gifts, one who was also an important and unique figure in neuropsychiatry.

And we have lost a personality which always furnished stimulating and pleasurable companionship.

The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry
Founded in 1874]

Original Articles

THE SIGNIFICANCE OF PHYLOGENETIC AND ONTO- GENETIC STUDIES FOR THE NEUROPATHOLOGIST¹

BY DR. B. BROUWER

AMSTERDAM

If there is one part of the body of vertebrate animals, in which the great line, going upwards in the direction of man can be seen, it is the nervous system. The great mass of facts, which has been collected of late years by the workers in the comparative anatomy of the central nervous system, has gradually convinced neuropathologists, that an exact knowledge of the relations in lower animals has also an important value for the insight into the morphology and the physiology of the human nervous system. Certainly ontogenetic studies are of no less—even greater—importance than phylogenetic ones. Our knowledge of ontogenetic problems is however far from complete and phylogenetic studies may elucidate many points which hitherto have remained unexplained.

The advantage of tracing things back to lower forms, which are more simple and therefore more clear, exists not only for the morphologist and the physiologist, but also for the pathologist as well. This is not sufficiently understood by pathologists. Several facts, found by different workers, show that the more recent acquisitions of the central nervous system are less resistant to noxious agents than older parts (Bolton, Edinger, Vogt and Astwazaturow, Stärcke,

¹ From the Central Institute for Brain Research of Holland and the Neurological Clinic in Amsterdam. *Psychiatrische en Neurologische Bladen*, Feestbundel Winkler, 1918.

Jelgersma, Kooy and others). I also have described cases that prove the importance of this rule.

In this article I will discuss some clinical facts, that are more comprehensible when they are regarded from the point of view of such evolution. I have chosen multiple sclerosis, because this disease has always been placed in the center of our interest by my master, Winkler, to whom this article is dedicated. In addition I have taken different cases of neuritis of the median nerve. I am greatly indebted to Professor J. K. A. Wertheim Salomonson and Professor W. M. de Vries, of the University of Amsterdam, for the material obtained.

PART I

Biological Reflections on Multiple Sclerosis

The relation between the clinical symptoms and the anatomical results, is a side of the problem of multiple sclerosis that has given great difficulties, since there seems to be a sort of disproportion between them. Neurologists, who usually control their clinical findings by anatomical researches, know how dangerous it is to prophesy the extension and the localization of the sclerotic foci by the clinical symptoms. Several authors have expected to see extensive damages in the medulla oblongata in cases with severe dysarthria and have not found them. The contrary equally occurs: one often sees many parts of the central nervous system strewn with sclerotic foci, while during life no clinical symptoms, which could have supposed such alterations, were observed. It is also proved that in the so-called spinal-forms of multiple sclerosis the foci are not always localized chiefly in the medulla. Generally one finds on anatomical section more than could be found clinically. So Oppenheim says, that in all the cases, which he has anatomically controlled, he has found plaques in the radix spinalis nervi quinti, but in none of these had he obtained disturbances in the sensibility of the face.

The comparison between the clinical and the anatomical results in multiple sclerosis leads us to ask: how can it be, that in this disease, where the whole central nervous system is so irregularly strewn with foci, some regularity in the clinical picture can still be obtained? Then, though multiple sclerosis is rich in forms and variations, yet one cannot deny that a certain group of symptoms dominates in this disease. These are especially the spastic paresis of the legs with increased reflexes and positive Babinski, the dis-

turbances in the coördination (ataxia, tremor!) the horizontal nystagmus, the dysarthria, the disappearance of the abdominal reflexes. When some of these principal symptoms are missing, the diagnosis of multiple sclerosis is scarcely permitted. Sensory disturbances, abnormalities in the motility of the eye-muscles, bladder and rectal functions remain in the background. They are very common in this disease, it is true, but they are less intensive and more transitory.

Several authors have tried to explain this contrast between the clinical image and the anatomical substratum. So it has been said that spastic pareses are so frequent, since they are caused by the affection of the pyramidal tracts. These are longer than other tracts and therefore have a greater chance to be attacked by foci. Another says that the disturbances in the sensibility are rarely durable, since the sensory fibers are more resistant than the motor ones (Gowers). E. Müller explained this fact by arguing, that there are more ways open for the conduction of sensory stimuli than for motor stimuli. Still other authors believe, that it is not possible to explain the chief symptoms of multiple sclerosis by circumscribed, well-localized alterations of the central nervous system. They only speak therefore of the "general symptoms" of this illness.

It is strange that one has never tried to consider all the symptoms from one standpoint. I will try to do so, but first I must speak about the pathological anatomy of this disease. Two opinions about the pathogenesis of multiple sclerosis prevail: the theory of primary glia disease and the theory of inflammation.

The first (Charcot, von Strümpell) says, that multiple sclerosis is a primary affection of the glia, thus a primary affection of the supporting tissue, which is irritated by an unknown impulse and therefore begins to grow amply. This glia-tissue presses upon the cells and the fibers, and causes in this way the clinical symptoms. The chief moment consequently should be a congenital weakness of the central nervous system. The second conception says, that the sclerotic foci in this disease are the result of chronic inflammation (Pierre Marie, von Leijden and others). This process must be caused by an infectious agent: the abundant growth of the supporting tissue being only a reactive process.

My own researches have convinced me that the latter opinion is the more probable. It is here not the place to mention all the arguments in this question. But one fact may be told in a few words: it can be easily demonstrated, that the noxious agents must be conducted to the central nervous system by the blood paths. Fig. 1 shows the extension of a focus in the medulla spinalis of a typical case in

my experience. Fig. 2 is a drawing from Winkler's book, from a patient with a circumscribed necrosis of the medulla spinalis, caused by a thrombosis in a ventral spinal bloodvessel. The resemblance

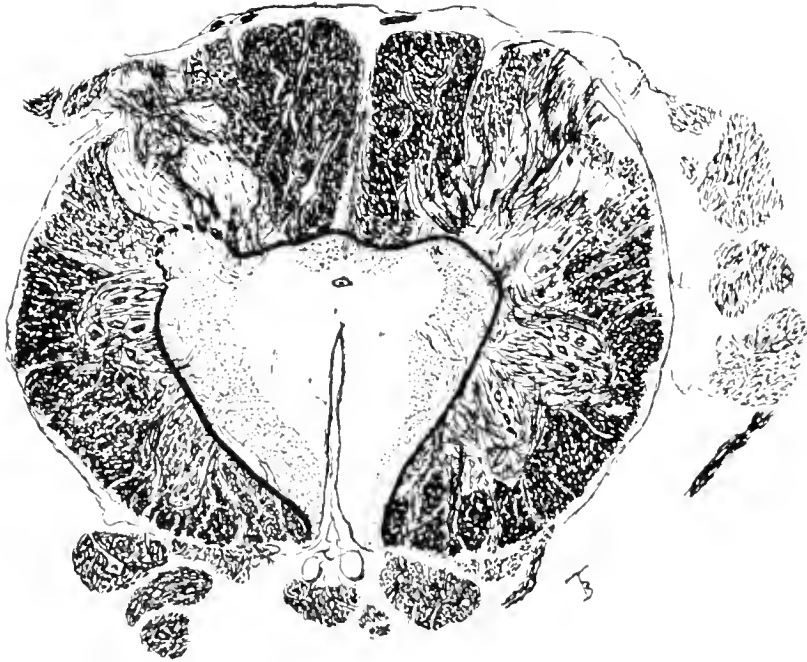


FIG. 1. Shows the extension of a sclerotic focus in multiple sclerosis.

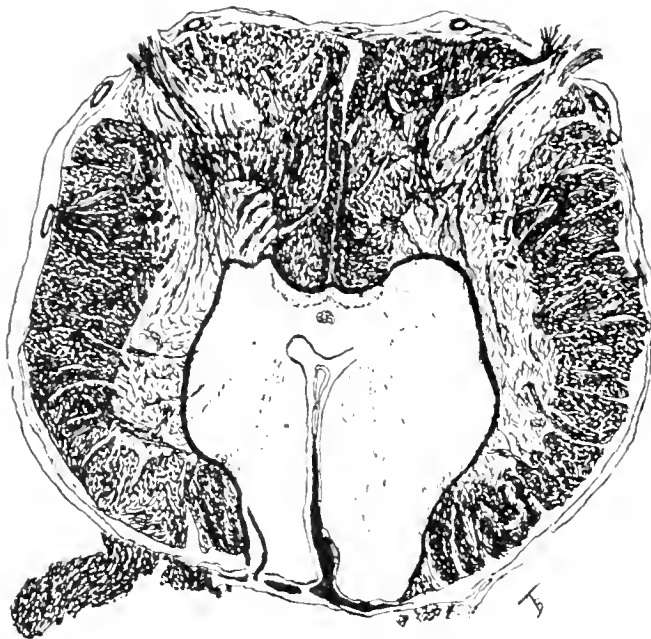


FIG. 2. Shows the extension of the necrosis by thrombosis in a ventral spinal bloodvessel (after Winkler).

between the two cases is striking and it is not difficult to find more places in the central nervous system, where the extension of the sclerotic foci conforms with the territory of a bloodvessel. This

seems to me a strong argument for the opinion, that sclerosis multiplex is not a glia disease, caused by an endogenetic moment, but that it is an infection, caused by an exogenous moment.

Everybody knows, that in multiple sclerosis the myelin is much more damaged than the cells and the axis cylinders. However, it is not permitted to regard this isolated destruction of the myelin as pathognomic for the multiple sclerosis. It is also found in several parts of the central nervous system in dementia paralytica, and in the peripheral nervous system this finding is even very common. Gombault was the first to point out this fact by several experiments and since his researches it has very often been found in the pathological anatomy of neuritis: the myelin is destroyed in the nerves, but the axis cylinder resists. This form of neuritis is called neuritis periaxialis. The fact that the myelin is destroyed and the axis-cylinder is spared is therefore not specific for multiple sclerosis, though it is present here on a large scale. It seems to me that this can be explained by accepting that the inflammatory process is but a feeble one. The force of the noxious agent fails to destroy the whole neuron, it is not strong enough to destroy the cell and the axis cylinder.

Now returning to the question concerning the connection between the clinical symptoms and the anatomical substratum, I will mention some examples from my own experience.

No. I. A female patient with multiple sclerosis has never shown other disturbances in the motility of the cranial nerves, than a slight paresis of the left facial nerve. Speech however was almost totally impossible. In this case I found the brain stem richly involved by sclerotic foci, not only in the nuclei of the cranial nerves, but also in their roots (see Figs. 3 and 4). One may say: it is not astonishing that the cranial nerves have not shown more paresis clinically, because we know that the axis cylinders are saved in the sclerotic area and the stimuli can pass. This is right, but *why then could not the patient speak?*

No. II. It is a very regularly and early appearing symptom of disseminated sclerosis, that the abdominal reflexes disappear. Must it be explained by the fact that this reflex goes partly over the forebrain and that these communicating fibers are interrupted? But the knee reflex also has a communication with the forebrain and *why does this reflex not disappear with the same regularity as the abdominal reflex, when there are so many sclerotic foci in the thoracic and lumbar part of the spinal cord?*

No. III. In this case nystagmus was present. Anatomical re-



FIG. 3. The brain stem is filled up with sclerotic foci. There was a slight pareses of the left facial nerve, but no other disturbances in the motility of the head nerves. Speech, however, was almost totally impossible.



FIG. 4. Sclerotic foci in the brain stem and in the cerebellum in multiple sclerosis.

search teaches that there are many foci in the medulla oblongata, that can explain a nystagmus. But, *why was the nystagmus only a horizontal one, and why is this horizontal nystagmus obtained by moving of the eyes sideways so frequent in multiple sclerosis?* And why do these sclerotic areas not cause a permanent palsy of the sixth or seventh nerves, since anatomically there are so many occasions for this?

No. IV. Fig. 5 shows that there was in this case an almost total transverse lesion of the thoracic part of the spinal cord. The palsy of the legs was almost a total one, but the patient reacted until death upon pin-pricks on the legs, while also tactile stimuli were perceived. *How shall such a contrast between the motor and sensory disturbance be explained?*



FIG. 5. Sclerotic focus in the thoracic part of the spinal cord in multiple sclerosis.

No. V. In the majority of the cases with atrophy of the optic disk, only the temporal half is pale. The nasal half remains normal (symptom of Uhthoff). When one now examines the observations of the anatomical alterations in the optic nerves, a diffuse lesion is always found. The sclerotic foci are irregularly spread through the nervi optici and the tractus. It is even sometimes found that the whole transverse section of the nerve is filled with sclerotic tissue, while clinically there was only found a pale temporal half of the disk. It does not seem astonishing that the nasal half is not de-

generated, since the axis cylinders are saved in this process and it is therefore not necessary that a secondary degeneration is caused. This is correct, *but why then does the temporal half become pale?*

I will now let other difficulties rest, but only add to these examples the interesting fact, that the same clinical picture as disseminated sclerosis is also found in other diseases where the medulla oblongata and the medulla spinalis do not show sclerotic foci. The most striking is "lobar sclerosis." The pathological anatomy of this disease corresponds with that of multiple sclerosis, but the sclerotic foci are larger and found only in the hemispheres of the forebrain and it is very difficult to explain why the clinical pictures of these diseases show such a great resemblance, while the regional extension of the process is so different.

It seems possible to me to reconcile these difficulties, by looking at it from the point of view of evolution. One must admit that the older parts of the central nervous system, wherein primitive functions are regulated, have greater resistance to noxious agents than the phylogenetic and ontogenetic younger parts, wherein the higher functions are localized. If we first look at point 1, it is clear from this point of view, that the tracts that conduct the function of speech are severely damaged in their function, while the tracts of the cranial nerves for the more simple movements remain normal. The first are the so-called phonetic tracts, that descend from the forebrain to the motor nuclei of the oblongata and also the cerebro-cerebellar tracts. That these systems have little resistance is not astonishing, since phonation is a very high function, which appears only late in phylogenesis as well as in ontogenesis.

The same idea can be followed for the abdominal reflexes. Generally the term "reflex" is used for mechanisms of lower order. But there are several reflex movements which are the expression of a higher organization and appear very late in phylogeny and ontogeny. Among these is the abdominal reflex, which only occurs in primates, while the knee reflexes on the other side are found in several lower mammals. The abdominal reflexes appear late in ontogenesis (Cattaneo, Bychowski). The knee reflex is already present at the birth, but the abdominal reflex does not appear until at the age of some months. So the latter are phylogenetically and ontogenetically younger and consequently less resistant.

In this way we can also understand something of point 3, the frequent occurrence of horizontal nystagmus. It is obvious, that we must explain the symptom by the foci in the medulla oblongata and especially by those in the region of Deiters nucleus and the

fasciculus longitudinalis posterior. But when we will understand why the other symptoms, depending on foci in this region, are missing, we must admit that not every part of the medulla oblongata is reacting in the same intensity upon the noxious agents. We know that horizontal nystagmus on lateral moving of the eyes is a very early and regular symptom in this disease. We can understand this fact, when we consider that the sideways movement of both eyes at the same time in the horizontal plane is a function which is only present in higher mammals, where the eyes are placed more in the front of the head and where the structure of the face makes it possible that such a function has acquired a great significance.

In this connection I may observe that experiences in this war have taught, that it is hardly possible to use horizontal nystagmus for topographic diagnosis, since this symptom appears in so many different injuries of the brain without any regularity.

Concerning point 4, it is an often stated fact, that disturbances in motility in multiple sclerosis are much greater and more frequent than those in sensibility. The spastic-paresis in almost every case of sclerosis multiplex has some peculiarity that is not found in pure spinal cord diseases. In the majority of the cases it is accompanied by a disturbance of muscle coördination. The paresis is the consequence of the damage to the pyramidal tracts. These are phylogenetically and ontogenetically young, especially the part for the legs, and we can understand, that this function suffers frequently and early.

The spasm is caused by the circumstance that the phylogenetically older, subcortical motor tracts preponderate in the function of the motility. With regard to disturbance in coördination, it is not superfluous to remember, that this is also an early and very persistent phenomenon. Meijer published some years ago a valuable paper about this fact. He showed after an accurate investigation of a large clinical material, that a slight trembling, a slight disturbance of the equilibrium and a slight disorder in the right coöperation of the muscles of the trunk and the extremities, are very frequent in early periods of this syndrome. They are often found in cases where the force of the movements is still normal. Several authors are inclined to ascribe these disturbances of coördination to the cerebellum. It seems to me that this is not justified. For, although the researches of late years have taught that the cerebellum is more frequently affected than Charcot believed, this is yet too rare to explain such a frequently appearing symptom as this disturbance of coördination.

For a better insight into this question, we must study the cerebro-cerebellar tracts in the pons Varolii which are important conductors of this function. It is generally known how this part of the central nervous system grows enormously in higher mammals and how these systems especially in man—probably also in connection with the erect position—have most developed. The same can be stated ontogenetically since the cerebro-cerebellar tracts have a late myelinization, still later than the pyramidal tracts. The great number of foci regularly found in these areas makes it comprehensible that an injury to these young systems gives a disturbance in the function depending on these tracts.

As far as sensibility is concerned, I have demonstrated in another paper that there must be a great uniformity in the anatomical organization of the sensibility in the medulla spinalis and the medulla oblongata of vertebrates. The systems for conducting the touch, pain, heat and cold stimuli must be organized in the lower animals almost in the same manner as in man. They are the phylogenetically older systems of sensibility. The stereognostic and discriminative sensibility on the other hand are recent perfections of the nervous system. It is in the first place the deep afferent system, through which we gain our knowledge concerning the posture of the limbs and the power of recognizing passive movements and it is in the second place the system for the function of tactile discrimination of two points, which are more highly developed in the primates. These are the phylogenetically younger systems of sensibility.

We know that disturbances of sensibility in multiple sclerosis are rarely intensive and persistent. In the views defended here we must expect that the sense of deep sensibility and the sense of tactile discrimination are oftener disturbed. In regard to deep sensibility this is true, as Finkelnburg has shown, and it is proved by my own researches in multiple sclerosis. In many cases I found that only the deep sensibility sense was damaged. Tactile discrimination of two points is still insufficiently examined in these cases. The researches in this direction are very difficult, since patients with multiple sclerosis are very often slightly deteriorated, and therefore are unsufficient for fine tests.

From the same standpoint it seems also possible to find an explanation of point 6, the symptom of Uhthoff. We must ask, what is the essential difference between the nasal and the temporal half of the optic disk at the moment that the optic nerve penetrates the eyeball. We know, chiefly through the researches of Henschen, that the nasal half of the optic nerve is composed of fibers, all of

which cross. In the temporal half we find the fovea bundle and the fibers that run uncrossed. In animals lower than mammals, the nervous opticus is totally crossed. This is partly the consequence of their lower organization, chiefly because of the fact that the eyes are standing far sideways in the head.

In lower mammals, where the eyes also stand far sideways in the head, the number of non-crossing fibers is still small. Thus in the guinea pig the number of non-crossing fibers is but an insignificant one (von Monakow), also in the rabbit (Bach) and in the horse (Dexler). In the carnivora the number of non-crossing fibers is augmenting. The difference between the cat and the dog is striking; in the latter the number of non-crossing fibers is smaller than in the former, which can be understood from the difference in the placing of the eyes in the head (von Gudden). The number of direct fibers is great in primates, especially in man. But in phylogenesis there can be found a higher development not only of the direct fibers, but also of the fovea bundle. It is well known, that the macula lutea in man shows a high degree of perfection. The macula has a fovea, and this region is more richly provided with ganglion cells than the remaining part of the retina. In the animals this relation is more simple.

Among the mammals a real fovea is present only in primates. G. Fritsch has shown that the presence of a real fovea is already doubtful in prosimiæ and that it is lacking in lower mammals. In the cat this spot is only represented by a little eminence, exhibiting a slight thickening of the layer of ganglion cells (Ganser). In non-mammalia a fovea occurs only in birds.¹ Birds, with their enormous visual faculty, stand apart in the series of vertebrates and in regard to the fovea they also make an exception. Although these relations are not yet sufficiently examined, it is probable that the fovea bundle in the lower mammals—even if this exists—is represented only by very few fibers, and certainly is much smaller than in primates.

In Fig. 6 I have given a sketch of the phylogenetic evolution of the optic disk. From this it appears that two alterations take place in the phylogenesis: a large group of direct fibers appear, and besides the fovea bundle increases. There is no reason to assume that these fibers in different animals have another course than in man. We know that in the cat the same course of the direct fibers is stated by Ganser. They take their origin also in the temporal half of the retina and remain in the lateral part of the eye nerve.

¹ For some fishes the presence of a fovea is mentioned, but doubtful.

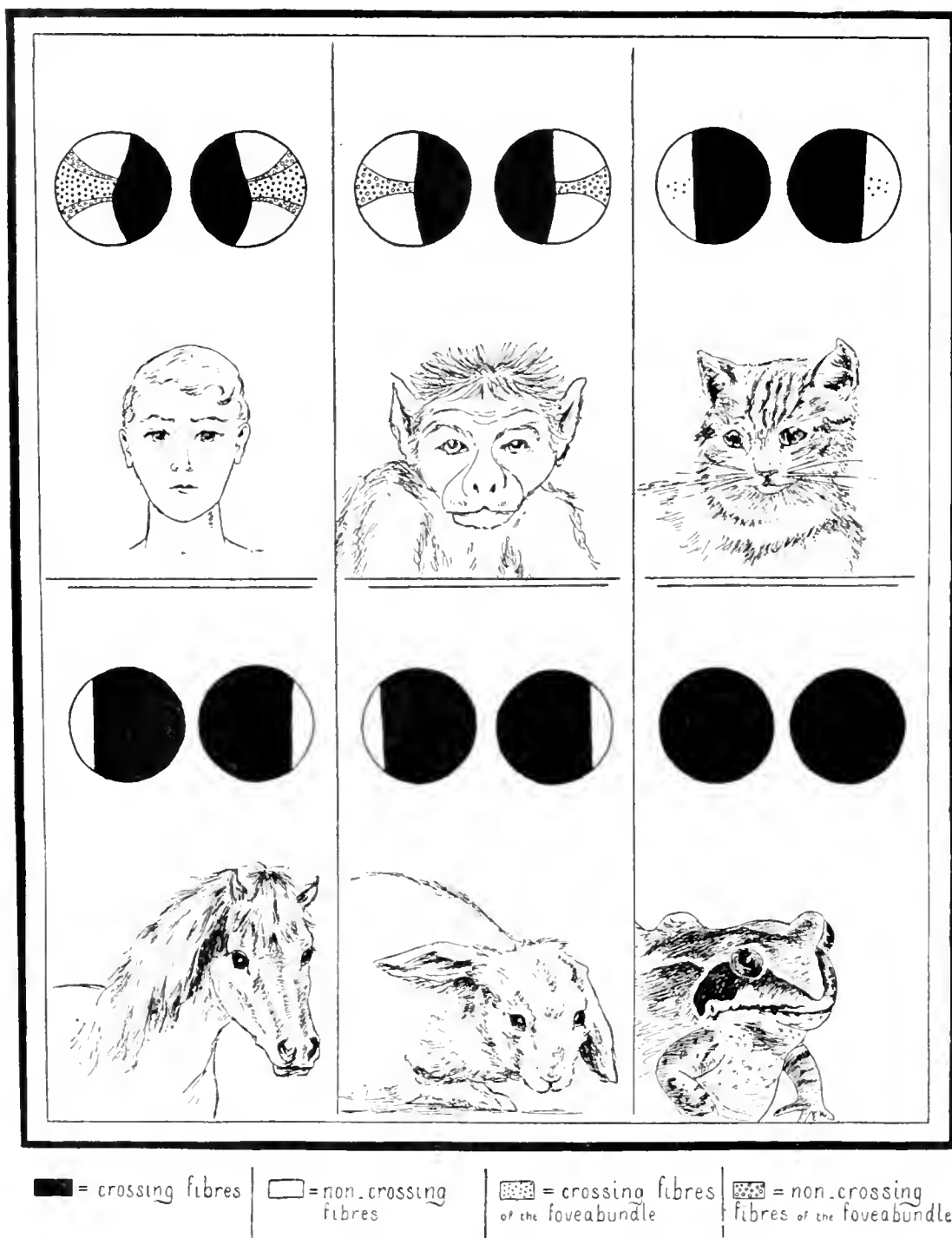


FIG. 6. An attempt to explain the symptom of Uhthoff.

In non-mammals the optic nerves are crossing totally. In mammals they cross partially. In mammals, where the eyes are standing far sideways, the number of the direct fibers is small. In animals, where the eyes are placed more in the front of the head, the number of the direct fibers is greater. They acquire the largest number in primates, especially in man. The non-crossing fibers are lying in the temporal half of the optic disk. Here also the fibers of the fovea bundle are located, which bundle is well developed in primates only.

Although the pathological process in multiple sclerosis is irregularly spread through the peripheral optic system, only the temporal half of the disk becomes pale. This is explained by the fact, that this is the phylogenetically younger part of the disk. The alterations in phylogenesis only took place in the temporal half, the nasal part remaining unaltered.

The phylogenetic alterations consequently are found in the temporal half of the disk, the nasal half remaining unchanged.

Although the pathological process is irregularly spread through the peripheral optic system, still it is not astonishing that only the temporal half becomes pale, this being phylogenetically the younger part of the disk.

One must place this atrophy of the optic nerve partly on the same level as the slight atrophy and degeneration of the pyramidal tracts, which is very often found in disseminated sclerosis (Fig. 7). It is only in this very young system, that we find this alteration, just as in the eye-nerve. The atrophy of the disk must be partly a direct result of the inflammation of the optic nerves. In regard to the disturbance of vision in multiple sclerosis, it is not possible to give any rule for it. This can easily be understood, when one considers the anatomical relations. The alterations of the optic system by the sclerotic foci not only occur in the nerves, the chiasma and the tract, but also between the corpora geniculata externa and the regio calcarina. One finds regularly severe alterations in the geniculo-optic bundle along the ventricle. We therefore may not expect any regularity in the disturbances of the sight, especially not since these groups of alterations are very often present together. It may be remembered in this connection, that already in early stages of the disease central scotomata frequently appear, disturbances thus, which are caused by a lesion of the fovea bundle, which—as we saw—appears very late in the series of mammals.

It appears from this that, when we start from the evolution of the nervous system, we have a thread which can help us to find an agreement between the clinical and anatomical phenomena exhibited by this disease. Although the noxious agents in disseminated sclerosis damage of course also older and more primitive functions, such lesions stand in the background of the complex, and they are less intensive and not so persistent as the others.

The fact that by preference the higher, and the latest acquired functions are disturbed, is also available for the psychical alterations. The researches of late years have shown, that the cortex of the forebrain is more gravely affected than was formerly thought. The histological alterations are not so striking, while the glia fibers in the cortex have not such an inclination to grow excessively as in other parts of the central nervous system. Although these modifications in the cortex of the telencephalon vary greatly in intensity and in localization, the psychical phenomena of these sufferers are rather monotonous. The typical mental image of the patients with dissem-

inated sclerosis is a slight dementia, with a shrinking of their sight sphere and of their interest, a childlike feeling of security, a defective control of their affective life. Although still more severe alterations of the psyche may occur, these remain exceptions. It is very common, that the mental condition of these sufferers is reduced to that of the child, to the so-called "puérilisme mentale."

PART II

Biological Reflections on Neuritis of the Medianus

In recent years, while examining patients with affections of the peripheral nerves, I was struck by a fact that seems important to the question that is dealt with here. In several cases I found a pathological alteration of the small muscles of the thumb, in so far as they are innervated by the median nerve, and more specially of the m. opponens pollicis and the m. abductor pollicis brevis. In these cases the other muscles of the median nerve were perfectly normal and the sensory disturbances insignificant. With the electric current no changes in the median nerve itself and in the muscles could be shown save in the opponens and in the abductor pollicis brevis. The contractions in these muscles formed a sharp contrast with those of the abductor pollicis. I cannot say how far the flexor pollicis brevis shared in this alteration, since it was not possible for me to stimulate this muscle, without causing contractions of the abductor pollicis. These alterations were not seldom found in cases where the function of the thumb was only a little reduced and sometimes the patients came for other reasons, and the finding of electric changes in these muscles was an unexpected one.

I will mention here the following examples of my experience of recent times.

CASE I. A. F. E., man, aged 67, tailor. Was always healthy until two years ago. Then he complained of a stiff sensation in the thumb and the index of both hands. He has never had pains. It appears that the muscles of the thumbs are atrophied. The opposition of the thumb is difficult on both sides, while the adduction is normal. The other muscles of the hand act very well. There are but slight disturbances in the sensibility of the palma manus. The median nerve is electrically unaltered, all the muscles of the hands react well, except the opponens and the abductor pollicis brevis, which do not react to the faradic current and show typical sluggish contractions to galvanic stimulation. No other nervous symptoms are found.

Hyperfunction can be regarded as a cause. The man has been a tailor for 40 years and in the sewing and cutting of his material he uses his thumbs in a very intensive manner. But it cannot be explained in this way why the long flexor muscles are spared.

CASE II. J. S., man, aged 49, tailor. Complains of late years of difficulty in the movements of the right thumb. He has no pain, no tingling in the fingers. The outer part of the thenar is wasted, there is a great difference with the left hand. Opposition of the thumb is difficult. Other functions of the hand-muscles normal. No disturbance in sensibility. Electric examination teaches that the median nerve reacts in a normal way on the faradic and galvanic current. The opponens and abductor pollicis brevis are not excitable by the faradic current. The reaction on the galvanic stimulation is diminished and shows typical sluggish contractions. There are no other symptoms from the side of the nervous system or from the internal organs.

Hyperfunction can be regarded as a cause. In his trade of tailor, the patient always cuts the material with his right hand with a pair of scissors. In this movement the long flexions and the adductor pollicis are also in function and it is not clear why these muscles remained normal.

CASE III. C. T., man, aged 68, tailor. He complains of pains in the abdomen and in the chest. Probably there is some illness of the stomach, but no symptoms of a disease of the central nervous system could be found. The patient believes that his hands are normal. The inspection teaches that the thenar muscles of both hands are atrophied. The function is not severely disturbed. The sensibility is normal. At the electric examination only an alteration in the opponens and in the abductor pollicis brevis is found. They are hardly excitable by the faradic current and react in a typical sluggish manner on the galvanic. There is in this connection a great difference with the adductor pollicis.

Hyperfunction can be regarded as a cause, as the patient has been a tailor for 25 years. This does not account for the exception of the long flexors and the adductor.

CASE IV. J. F. D., man, aged 57, tailor. Has complained for 5 weeks of pain in the left forearm. It began with tingling and pricking sensations in all the fingers of the left hand. The power in this hand has considerably diminished. No complaints of the right hand. Apparently an acute neuritis of the left radial, ulnar and median nerve exists. Further there is atrophy of the upper part of the right arm and of the right shoulder and several muscles of the left leg are wasted as a result of a poliomyelitis at the age of two years. The right fore arm and hand

is normal, except the thumb. Then there is atrophy of the outer part of the right thenar and the abductor pollicis brevis and opponens pollicis do not react on the faradic current, while the galvanic stimulation is followed by sluggish contractions.

For the cause the three former cases can be referred to. Patient is a tailor.

CASE V. C. C. W., man, aged 67. Has complained for half a year of a numb sensation in the left hand and of weakness in the left thumb. He lost his right arm 28 years ago. For the rest he is a normal and a hard-working man.

At the inspection nothing could be seen in the left hand. But the force in the opposition of the thumb is minimal. The other movements of the thumb and fingers are perfectly normal. There are disturbances of sensibility in the left hand, which partly show a psychogenous character. The median nerve reacts electrically normally, but the opponens and the abductor pollicis brevis do not react on the interrupted current and show very sluggish contractions to the galvanic current. There is a great difference in this connection with the adductor pollicis. No other symptoms of the nervous system and the inner organs.

The only cause which can be found is hyperfunction. The man for 20 years has pushed a handcart with his only hand, and clasps with his hand the handle of the cart. In this work he uses the thumb in an intensive way. But it cannot be defined in this way, why the other muscles of the hand do not alter.

CASE VI. v. d. V., man, aged 68, cigar maker, has suffered for 14 years from pain in the legs and has a numb and tingling sensation in the feet. He shows great ataxia and disturbances are found in the sensibility of the legs. The knee-reflex is present, the Achilles-reflexes have diminished. There are no other symptoms on the part of the central nervous system. No syphilis. The diagnosis is not clear, probably there exists here arteriosclerosis of the spinal cord. The patient does not complain of the right hand. But the outer part of the right thenar is wasted. Opposition of the thumb is possible, but feebly. The outer movements of the fingers and of the right hand are normal. The left hand is good. There are no disturbances in the sensibility of the right hand. The electric examination shows that the median nerve is reacting in a normal manner and that all the muscles of the right hand answer well to the currents, except the opponens and the abductor pollicis brevis, which cannot be stimulated.

Hyperfunction can be regarded as etiological moment. The patient has made cigars for many years. While cutting the tobacco

he presses the right thenar on the handle of his knife. But it is not clear why the adductor pollicis has remained normal.

CASE VII. J. S.—v. d. S., woman, aged 41. Typical case of *tabes dorsalis incipiens*. Ptosis, ataxia, absence of knee- and Achilles-reflexes, extensive disturbances in the sensibility of the legs and on the thorax.

No complaint of the hands. The sensibility in the hands is normal. The muscles of the right thenar are wasted. The left hand is normal. The opposition of the right thumb is paretic. There are only electric alterations in the abductor pollicis brevis and in the opponens. These muscles cannot be stimulated by the faradic current and the reactions to the galvanic current are sluggish.

As a special cause we may perhaps regard repeated pressure of the right thenar in washing, because the patient very often had to do a good deal of washing. But in this way it is not clear why the adductor has remained unaltered.

CASE VIII. G. J. S.—W., woman, aged 72. The patient was brought to the hospital, because she had lately showed psychical symptoms. From her birth she had deformed feet (Friedreich's feet). It appears that there is a slight dementia, caused by arteriosclerosis cerebri. Knee-reflexes have diminished and Achilles-reflexes are absent. No other symptoms from the part of the nervous system, no complaints of the hands. The inspection teaches that the muscles of the right hand are wasted (see Fig. 8). Opposition of the thumb is possible though feebly. No other alterations in the right hand, no disturbances in the sensibility. The left hand is normal. Electrically the right median nerve is normal, but the opponens and the abductor pollicis brevis do not react to the faradic or galvanic current. The adductor pollicis reacts quickly. The left hand is also electrically normal.

As a cause we may only regard the repeated pressure of the right thenar, in washing.

CASE IX. E. N., woman, aged 36. Since youth there has been a kyphoscoliosis. No symptoms of pressure on the medulla spinalis. The central nervous system is normal. No symptoms of a disease of the internal organs. The patient complains of pain in the arms, the shoulders and the chest. There is an arthritis of several articulations, also of hands and fingers. No sensations of tingling in the fingers.

On examination the atrophy of the thenars is immediately striking. The hypotenars are normally developed. The function of the hand is not very good in consequence of arthritis. There are no disturbances in the sensibility of both hands. The median nerve is electrically normal, and the long flexors are reacting quickly. The opponens and the ab-

ductor pollicis brevis do not react to the faradic current. In the right hand the contractility to the galvanic current is present, but the contractions are very sluggish. In the left hand these muscles do not react to galvanic stimulation. There is a great contrast with the adductor pollicis, which contracts quickly.

No cause is to be found, except perhaps the arthritis?

CASE X. A. M.—S., woman, aged 53. She had complained for half a year of weakness in the left thumb. Moreover she has a sensation of slight tingling in the left index and the left thumb. The left wrist is swollen and painful, when it is moved. The patient has shown for many years symptoms of rheumatism, which changes in localization and intensity. Objectively nothing is to be found of a disease of the central nervous system nor of the internal organs. There is no diabetes, no gout, but there is arthritis of the left wrist. The left thenar is atrophied, the right is normal. There is no arthritis of the fingers. The sensibility is normal. The opposition of the left opponens show but a slight force. There are only electric alterations in the opponens and the abductor pollicis of the left hand. They do not react to the faradic current and the galvanic contractions are very sluggish.

No cause could be found (arthritis?).

CASE XI. A. B.—P., woman, aged 61. She complains of decreasing fitness of the right hand. She has several arthritic swellings of the articulations of the fingers on both hands. There are no further symptoms. The right thenar is wasted, the left is normal. Opposition of the right thumb is possible. The median nerve reacts well to the electric stimulation, but the right abductor pollicis brevis and the opponens do not react to the faradic stimulation and show very sluggish contractions to the galvanic current.

No cause can be found (arthritis?).

CASE XII. W. M. C.—v. d. L., woman, aged 60. Four months ago she had an apoplexy, which caused a left-sided hemiparesis. Her condition has ameliorated since. On examination there is nothing more to be found of the hemiparesis. But there is an arthritis of the left shoulder and of the articulations of the left hand. The examination immediately teaches that the right thenar is wasted, while the left is normal. There are no further symptoms. No sensory disturbances are found in the right hand. The only electric alteration is shown by the opponens and the abductor pollicis brevis of the right hand. These muscles do not act to the interrupted current and show very sluggish contractions to galvanic stimulation. There is a great difference between the adductor pollicis and the median muscles of the left hand.

No cause could be found.

CASE XIII. A. S., man, aged 17, carpenter, has had a small wound on the left fore arm. No nerves or tendons are cut through. Symptoms of traumatic neurosis. On examination it is striking that the thenars are flat. The function of the thumb is not diminished, but the electric examination shows that the opponens and the abductor pollicis brevis do not react to the faradic current, while the galvanic current on the right side did not give contractions and on the left the contractions were very sluggish. No sensory disturbances. Internal organs normal.

No cause for the alterations could be found.

CASE XIV. L. de V., man, aged 15. Complains of pain in the right arm, which started a short time ago without evident cause. The left arm



FIG. 7. Slightly secondary degeneration of the pyramidal tract in multiple sclerosis.

was never painful. The patient has no paresthesia, no sensation of tingling in the fingers. Both the thenars are very flat. There are no symptoms of a disease of the central nervous system nor of the internal organs. The sensibility is perfectly normal. The median nerve can be very well stimulated by the electric current, but the opponens pollicis and abductor pollicis brevis react only with difficulty to the faradic current

and to galvanic stimulation. There are very sluggish contractions in these muscles, which form a sharp contrast with those of the adductor pollicis. The other muscles of forearms and hands are electrically normal.

No cause could be found for the alteration.

CASE XV. G. K., woman, aged 21, servant. She has had for many years a swelling of the left wrist. This is painful and causes a feebleness of the hand. The outer part of the left thumb is totally wasted, while the hypothenar and the interossei are normal. The right hand is unaltered and nothing is found of any disease of the internal organs nor of the central nervous system. The sensibility is also normal on the left side, but the electric examination showed that the opponens and the abductor pollicis brevis reacted in a very sluggish manner to the galvanic current which shows a great difference from the normal contraction of these muscles on the right side and of the adductor pollicis. The median nerve is normal and there are further no electric alterations on stimulation with the faradic and galvanic current.

No cause for these alterations (except perhaps rheumatism?) could be found out.

It may perhaps be allowed to class the first 4 cases, which are mentioned here, under the so-called professional neuritis of the median nerve (Oppenheim, Wertheim Salomonson). One could take hyperfunction as the real cause, explain the origin of the neuritis by the "Aufbrauchtheorie" of Edinger and give them the name of tailor neuritis. But in that way it cannot be understood why in this hyperfunction only the small muscles of the thumb are altered and why for example the long flexors remain well and react quickly to the electric current. Since these muscles too must have taken part in this hyperfunction, another explanation must be found for this fact, more especially because in several cases hyperfunction could not be proved. Can it be the arthritis or the old age of several patients? I believe, that there must be a deeper reason, why these muscles of the thumb or their nerve branches are so vulnerable, and I am inclined to think that here too the study of evolution can give some elucidation.

When we compare the muscular relations in animals, it appears that we must distinguish two groups of muscles, which are innervated by the median nerve, the real forearm muscles and the small muscles of the hand. When we see in literature how it is with the phylogenesis of the long flexors and pronators, it is clear that these muscles develop differently from the small muscles. Following the

descriptions of Kohlbrugge, we learn that in the *monkeys* all the long muscles of the median nerve can be found again in the same manner as in *homo*. The only difference is this that in some groups of primates, where the thumb is less independent and has not such an important function, the flexor pollicis longus is not a separate muscle, but forms a part of the musculus flexor digitorum profundus. In the group of the *carnivora* (Elberger and Baum) all the long muscles are also present. In these animals too the musculus flexor pollicis longus is not yet independent, but forms a sub-division of the musculus flexor digitorum profundus.



FIG. 8. Isolated degeneration of the opponens pollicis and the abductor pollicis in neuritis of the median nerve.

In the *Ungulata* these relations are strongly modified by the peculiar form of the feet. Yet in the horse the flexor digitorum profundus and the musculus flexor carpi radialis are present. For the pig the presence of a musculus pronator teres is also mentioned. In the *Rodentia* (the rabbit) all the long median muscles are present, except the pronator quadratus (Krause). Of the lower animals we can only examine the *frog*, which is accurately described by Gaupp. The analogy of the forearm muscles with those of the higher animals is very difficult to find, but it is certain that several long flexors are present.

In sharp contrast with the relatively slight variation in the phylogenesis of these long median muscles, there is a great difference in the small median muscles of the hand. Parallel with the less im-

portant and less independent function of the thumb, there is in several animals a great difference, compared with the anatomical relations in man. There are already several monkeys, where the opponens and the abductor pollicis brevis are small. Vrolik (cited by Kohlbrugge) says, that in lower *monkeys* the opponens pollicis is poorly developed and that it is absent in *Macacus*. In the *dog* the musculus abductor pollicis and the opponens are together only a small band, while the flexor pollicis brevis and especially the musculus adductor pollicis are well developed. In the *rabbit* the lumbricales and the interossei are present, but the other small muscles of the hand are absent. Of the lower animals the *frog* has a finely developed muscle system of the hand. The rudimental thumb has an adductor, but no opponens. There is an abductor pollicis, but this muscle cannot be homologized with the abductor pollicis brevis of higher animals, because it inserts on the distal part of the ulna itself.

Reviewing these facts, then it is clear in what way we have to judge the great vulnerability of the opponens and the abductor pollicis brevis, as the clinical observations have taught us. The finer construction of the thumb and the higher functional significance, which it has received in the phylogenesis, is accompanied by a greater vulnerability. And when we now see, how for example in the dog all the small hand-muscles are present, not only of the thenar, but also of the hypothenar just as in man and how only the opponens and the abductor pollicis brevis are much smaller, we arrive at the conclusion that the deeper cause of the vulnerability of these muscles and their nerves is the circumstance that they are phylogenetically younger.

It cannot be expected that this rule, *i.e.*, that younger parts of the nervous system are less resistant to noxious agents, is always immediately clear by the findings which one meets in pathology. For there are always several causes acting together in pathological conditions: viz., heredity, specific affinity of the noxious agents to definite parts of the central nervous system, the difference of the "portes d'entrée," the different intensity of the providing bloodvessels, etc. Thus it is as yet unknown why the noxious agents in poliomyelitis have such a preference for the grey matter. It seems at first sight that the above-described rule is not followed in this disease, since the larger cells of the grey matter are the most affected and these groups of cells belong partially to the oldest parts of the spinal cord. But Stürcke remarked how the process of the poliomyelitis acuta anterior attacks by preference the cervical and lumbar

enlargements. Paralysis of the trunk-muscles is very seldom seen. The pathologic-anatomy of this disease has also taught that the alterations in the thoracic part of the spinal cord are by far less intensive and less frequent than in the cervical and especially than in the lumbar enlargement. The muscles now of the trunk and their cells in the cornu anterius of the spinal cord have undergone in the phylogenesis and in the ontogenesis almost no differentiation. The muscles of the extremities on the contrary show a great development and variation in the evolution, especially those of the legs, which must be accompanied by great alterations in the cell-groups of the spinal cord. Assuming a special preference of the noxious agents of poliomyelitis acuta anterior for the grey matter, it is thus in the light of evolution clear, why these parts of the spinal cord are more especially attacked. It is therefore necessary to be very careful in the application of this rule and we must not deduce from the fact that in concrete cases it is not directly clear, that this rule has no further significance.

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THE AUSTRALIAN EPIDEMIC OF ACUTE ENCEPHALOMYELITIS: A CONSIDERATION OF THE LESION¹

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Early in 1917, and again at about the same time in 1918, towards the end of the hot, dry, summer season, a number of cases of a peculiar form of Acute Encephalo-myelitis occurred in certain country parts of New South Wales and the neighboring states of the commonwealth of Australia.

A full official account of this disease has been published in the Eighth Report of the Microbiological Laboratory (Bureau of Microbiology) for the year 1917, which is included in the Report of the Director General of Public Health, New South Wales, for the year ended December 31, 1917. Subsidiary papers dealing with special aspects of the disease appeared in the *British Medical Journal*, May 31, 1919, and in the *Medical Journal of Australia*, March 22, 1919.

The general result of the investigation may be briefly summarized as follows:

1. The disease was acute and often abrupt in onset, with a mortality of 70 per cent. The clinical manifestations were those of cerebro-spinal irritation, including pyrexia, coma, convulsions, and rigidity, and in most cases there was no evidence of paralysis. Paralysis of a limb, or of eye muscles, however, did occur in occasional cases, and when these survived an aftermath of paresis, such as so frequently follows acute poliomyelitis, was sometimes noted.

2. The occurrence of the disease was confined to a certain time of the year, namely, the late summer and autumn, and in New South Wales to a certain kind of climate, namely, the dry interior climate, in contradistinction to the muggier climate of the coastal districts and the cold of the highlands.

3. Histologically, the outstanding feature was distension of the

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perivenous sheaths by cells of lymphocyte appearance. The lesions were distributed throughout the brain and spinal cord, though their intensity varied in different cases and in different sites. The corpus striatum, pons, and medulla were the parts most usually and most intensely affected.

4. The disease was conveyed by intra-cerebral inoculation to monkeys (*Macacus rhesus*). In these animals the outstanding feature of the disease was intense incoördination, overshadowing paresis or paralysis, which occurred in some but not in all the affected animals.

5. From infected monkeys the disease was conveyed to sheep, and from these animals back again to the monkey, or to further sheep. The disease was also conveyed to a calf and a horse.

6. Of a series of sheep inoculated with the same material, in the same way and at the same time, some animals contracted the disease and died therefrom, others showed slight symptoms suggestive of encephalomyelitis, from which they recovered, while still other animals appeared to be completely unaffected. In some of the last, subsequent similar introductions of a potent virus also failed to evoke the disease.

On reviewing the summary above, but more particularly from the study of the full report, it may be seen that the Australian disease, popularly termed "X disease" from its originally unrecognized nature, must be considered as a distinct clinical entity, in which the majority of the cases showed a course, clinical signs and symptoms, and histological appearances closely similar to each other, but not characteristic of the majority of cases in epidemics of other recognized entities, such as acute poliomyelitis (infantile paralysis). It is true that individual cases might quite well be labelled, on clinical and histological grounds, as somewhat aberrant instances of acute poliomyelitis (infantile paralysis); and contrariwise, that cases occurring during an epidemic of the latter disease might quite well be labelled as unusual examples of the disease we are now discussing. Taking, however, the general clinical manifestations of the disease—we refer in particular to the high mortality, the **fulminant** features, the affection of old as well as young, and the successful transmission of the disease to sheep—it is clear that we would at present not be justified in assuming that the Australian epidemic was the same disease as acute poliomyelitis, more especially when we turn to the experiments, in which the disease was conveyed to sheep, a calf, and a horse, animals which have so far proved refractory to the virus of acute poliomyelitis. We have in fact one of two alternatives which

may be adopted to explain the relationship of this disease to acute poliomyelitis. Either its virus may be a mutant, breeding relatively true, of the virus of acute poliomyelitis—a mutant which may not as yet be absolutely fixed in type, and which in course of time may revert in type, producing again only exceptional cases resembling those met with in the Australian outbreak. Or we may assume that this disease is a distinct entity due to a different species of organism. Obviously, however, it is closely allied to that producing acute poliomyelitis and more remotely related to the virus of such a disease as hydrophobia. In other words, either the Australian disease is due to a species of organism “in the making,” derived from the virus of ordinary acute poliomyelitis, or it is due to a similarly descended organism, but one which has been established in specific rank for ages and has hitherto escaped recognition and unravelling from the mass of allied organisms and the diseases they evoke. Which of these two alternatives is correct further experience alone can decide.

In the present paper, it is our intention to discuss certain histological aspects of this group of diseases, which, though speculative, may be of interest and may eventually lead to some practical result.

The round-celled perivenous sheath, such an outstanding and prominent feature of the Australian disease both in human beings and in animals, is a feature well worthy of further consideration, both as to its origin and its effects. It is the first visible change and an essential constituent of the focal and general encephalomyelitis which histologically characterizes the disease. Such perivenous sheaths and the cellular islands, to which we have elsewhere drawn attention, are also features of acute poliomyelitis and hydrophobia, whilst their analogues occur in general paralysis of the insane, due to infection with *Spirocheta pallida*. Moreover, lymphocyte-like sheaths may be seen associated with definite meningitis and also other affections of the nervous system. We append notes on several cases in which we have met with such a condition. Let us consider for a moment the significance of these sheaths of cells. It must be agreed that their presence is a result of the reaction of the tissues to some injurious agent, but an agent not sufficiently irritating, or of a nature, to produce a polymorphonuclear reaction such as results from invasion by pyogenic bacteria. In comparison with pyogenic irritants this irritant must be milder or less acute in action, and it must presumably be purely mechanical, or purely chemical, or a combination of the two. We know that inert foreign bodies, as, for example, sterile splinters of wood, paraffin used for correcting deformities, sterile extravasated blood cells, sterile fragments of ex-

plosive shells, etc., by their more mechanical presence, apart from any soluble chemical constituents, may cause a reaction amongst the cells of the tissues in which they are embedded, which reaction is manifested by proliferation of the connective tissue cells, the presence of some lymphocytes and plasma cells, and the formation of fibrous tissue. The chronic mechanical irritant by its mere presence leads to a cellular response in the tissues, with the ultimate object of surrounding the foreign body by scar tissue and thus immobilizing it. In tuberculosis we find the tubercle bacillus such a mechanical foreign body, giving rise to a similar reaction, but the effects are complicated by toxins derived from the tubercle bacillus itself, which modify the result. It is, therefore, clear that the mere presence mechanically of foreign particles may lead to a cellular response. Quite apart from the results mechanically brought about in their immediate neighborhood by the foreign particles, soluble chemical bodies, either directly derived from such foreign invaders, or indirectly from the host-tissues by secondary changes induced in them, might cause similar reactions in adjacent parts, too remote to be influenced mechanically, but not too remote to feel the influence of such chemical irritants, provided that irritant be sufficiently powerful and concentrated.

Returning now to our lymphocyte sheath in acute encephalomyelitis, does it represent the cellular response to mechanical irritants (the bodies of the organisms responsible for the disease), which are located in the immediate neighborhood, or does it represent the cellular response to toxins derived from organisms, lodged at some distance away from, but within the drainage area of, the sheath? In the one case we might imagine multitudes of these living organisms aggregated in the immediate neighborhood of the veins and mechanically causing the response. In the second case the organisms may be living and multiplying at a distance, as for instance in the nerve cells, and the toxins, produced by them or as the result of their destructive action on the tissues, may pass down towards the veins but only when they reach the immediate neighborhood of the vein be able to call forth a recognizable histological response to their presence. If the Negri bodies seen in the nerve cells in hydrophobia actually represent the only location of the parasite of this disease, and if the destruction of nerve cells in anterior poliomyelitis be due to the organism of this disease being located in the nerve cells, then a chemical factor would have to be held responsible for the cellular reaction, though it is possible that in the neighborhood of the vessels both the organism and its toxins might be present.

Similarly the cellular reaction in general paralysis of the insane may be chiefly a chemical response to the toxins of the *Spirocheta pallida* or to toxins liberated from the tissues as a result of the damage done by this organism, though the presence of the spirocheta itself, purely as a mechanical foreign body, may aggravate the condition.

In the group of diseases to which acute encephalomyelitis belongs, our own opinion is that this cellular response is due to a chemical irritant, though we think it quite possible that the responsible organism may be more heavily seeded in the sheaths of the veins than elsewhere. At any rate, in attempts by special staining methods to recognize the organisms in the tissues, we would pay particular attention not only to the nerve cells but to the site of special cellular reaction. The cellular response must be regarded as an attempt to restrict and repair injury. The cellular elements are derived from the blood. Perhaps in a slowed stream they find an easy passage through the thin vein wall and congregate in the perivenous space, debarred from further passage by the meso-ectodermal biological boundary. From capillaries their escape is less, possibly because the stream is faster. From arteries there can be no escape on account of the thickness of the wall.

Let us now consider the effects of these cellular reactions. In the Australian disease, in both man and animals, the perivenous sheaths were the outstanding histological features. Lesions of nerve cells were relatively insignificant and in our opinion were probably secondary and the product of nutritive interference. The sheaths were so intense that one could come only to one conclusion, namely, that they were directly responsible for most of the signs and symptoms of the disease. In other words, we attributed these signs and symptoms, not to the mechanical presence of the virus, not immediately to its toxins, but to the mechanical and physiological effects of the cellular response to which the organism and the toxins associated with its presence gave rise. We believe that the irritant, namely the organism or its derivatives, gives rise to an undue response on the part of the host, a response so excessive that it interferes with the functions of the parts concerned and in this way leads to the clinical phenomena of the disease.

Let us see how such a view fits in with the behaviour of this group of diseases in general, and the experimental results obtained with this particular disease. We have established the fact that human beings, monkeys, sheep, calf, and horse, are all species of animals that can act as hosts to the organism. We know that individuals amongst these species react violently, as shown by the inten-

sity of the sheaths produced. In experimenting on a series of sheep, however, we met with anomalous and most interesting results. Of a series say of six of these animals—all inoculated intracerebrally at the same time, in the same way, and with the same amount of the same virus—two might develop the disease and die from it, two might show slight symptoms apparently referable to encephalomyelitis and recover, and two might show no departure whatsoever from the normal.

How are we to explain these different results when they follow the actual introduction of the virus into a soil in which it can propagate itself? We believe the explanation to be as follows:

Individuals of a species (sheep) vary in the degree of cellular reaction to the presence of the virus. When the cellular response is great, the animal dies from the physiological effects. When the response is moderate, some signs and symptoms are manifested, but the interference with the physiological needs of the noble cells of the brain and spinal cord is not sufficiently great to lead to death, and the brain is able to maintain its functions until the cellular accumulation is reabsorbed, and so the animal recovers. Sheep that show no signs whatsoever of the disease are believed to be animals in which, though the virus may have multiplied, the cellular response has been so slight as not to interfere sufficiently with physiological functions as to give rise to any recognizable departure from the normal. In this latter case the virus and the animal may be considered as living together in symbiosis, the symbiotic association becoming mildly parasitic in the case where the animal recovers and fatally parasitic in the instances where death occurs.

We may now apply our results in sheep to the behavior of human beings to these diseases. Why in the presence of epidemics of acute poliomyelitis, or acute encephalomyelitis, do only a few individuals suffer, when there is evidence suggestive of many members of the community harboring the organisms of at least the first of these diseases? Hitherto the general interpretation has been that the organism may be present in the nasopharynx of many individuals, but is in general unable to pass from this situation to the central nervous system, whereas in those cases in which it can find a road to the brain or spinal cord the disease develops. We believe that the paucity of cases in an epidemic, though perhaps due in part to this natural barrier, is chiefly due to the fact that many individuals in the community react to the presence of the virus or its toxins in the nervous system to such a slight degree, that no interference with physiological functions result, and hence there are no manifestations

of illness. In other individuals the reaction is a degree heavier and thus we find evidence of abortive cases, while lastly in a few individuals the reaction is great and the interference with function pronounced. We would go further and suggest that various seasonal and climatic factors together with injurious influences of various kinds, more especially trauma to the head and exposure to heat, may intensify the response of the individual to such a virus or its toxins, and that in this way may be explained the seasonal prevalence of the disease and its occasional association with injury.

Case 1.—Lesions of Acute Encephalomyelitis Subsequent to an Injury.—The following case is of considerable interest and importance. The lesions found were typical of those met with in cases of acute encephalomyelitis in other parts of New South Wales. The patient, however, lived in Sydney, a locality unaffected during the two epidemics of this disease. Moreover, the illness occurred in September, 1918, a period of the year separated by several months from that in which the last cases of acute encephalomyelitis occurred in the country. Still further, the development of the illness was preceded, by a week, by a criminal assault on the patient from which he had apparently completely recovered. Arrests were made in connection with this assault, but as the histological examination showed death from disease apparently not in any way directly connected with the assault, the coroner did not return a verdict of murder or manslaughter. The provisional conclusion we have come to as to the nature of the illness is that it was an example of the same disease, acute encephalomyelitis, manifested previously in country districts, and we would offer the following suggestion as to the development of the disease in this particular individual. We think it possible that at the time when he was assaulted he was harboring, perhaps in his central nervous system, the organism responsible for this disease and was in fact one of probably many such carriers amongst the community. The assault and slight trauma may have led to his tissues reacting to the presence of the virus, whereas had such slight injury not been inflicted no cellular response with its accompanying clinical phenomena would have resulted.

E. W., a male, was assaulted on September 2, 1918. The nature of the injury received is not known, but cannot have been great as he continued at work for a week afterwards. He then became ill, and was admitted to the Sydney Hospital on September 18 in a semi-comatose condition. Lumbar puncture yielded clear fluid. He died on September 24. The ante-mortem diagnoses suggested were tubercular meningitis, fractured skull, etc.

At the post-mortem examination the brain showed some congestion, the lungs were congested, the spleen was rather soft and the kidneys were pale. There was no evidence of injury to the skull. No growth was obtained, on blood agar and other media, from the spleen, and cul-

tures from the lungs and the mesenteric glands yielded no organism of special significance. The histological examination of the brain showed congestion only in the parietal, frontal, temporo-sphenoidal, and occipital regions. In the internal capsule one vein showed a moderate sheath of lymphocytes several layers deep. The pons showed intense congestion with lymphocytic sheaths, marked around some veins, slight around others, and also some extravasations of blood around the small vessels. The medulla showed some intense perivenous sheaths as did the cervical cord. The cerebellum and upper dorsal cord showed no particular changes, but the lumbar area of the cord showed some congestion.

Case 2.—A Case Showing Polymorphonuclear Meningitis with Perivenous Sheaths of Lymphocytes in the substance of the brain in a patient, who, suffering from mental depression, died after exposure from sunburn.—This case is interesting and its interpretation obscure. The polymorphonuclear meningitis, an acute process, could have only existed for a short period and could not explain the mental depression, which it is stated had existed for a long period. The lymphocytic perivenous sheaths, however, might explain the mental symptoms, especially if this reaction had a syphilitic origin. On the other hand it is possible that the intense sunburn, the immediate cause of death, was responsible for the development of the brain lesions as well as of the skin lesions. It is an interesting fact worthy of note that siriasis, a disease occurring in hot climates as a result of high temperatures, has a clinical resemblance to some of our cases of acute encephalomyelitis, though siriasis is attributed to a physical and not to an organismal cause. This case is quoted as showing the association of lymphocytic sheaths with a polymorphonuclear meningitis, the explanation of the concurrence of the two forms of lesion being either that they represented unrelated causes, or that the irritant producing a polymorphonuclear exudate on the surface of the brain was so weakened or altered when it reached the substance of the brain that a lymphocytic response was elicited instead.

T. A. H., a woman, aged 50 years, had been suffering from mental depression with delusions of suspicion for a long time. She left her room between 1 and 2 a.m. on November 9, 1918, and about 10 a.m. on November 10, a very hot day, was found dead on a vacant piece of land. There was extensive burning, thought to be due to exposure to the sun, on the right shoulder and arm, and both legs. On post-mortem examination the lungs were edematous. There was much atheroma of the coronary vessels and of the aorta, and in the brain atrophy of the convolutions with an exudate of thick, serous material, in large amount. Microscopic sections showed the pia mater thickened and infiltrated with polymorphonuclear cells, together with a few rounded cells, especially over the cerebrum, cerebellum, and medulla. In sections of the frontal and temporal regions, and of the internal capsule, large veins were seen heavily "collared" with lymphocyte-like cells as met with in acute encephalomyelitis. Such veins were not seen in the pons, medulla, cerebellum, or parietal or occipital regions of the cervical cortex.

Case 3.—A Case of Hemorrhage into the Lateral Ventricle after Influenza with Lymphocytic Sheaths round the Veins in the Neighborhood.

—This case is chosen to show the effect of a chronic irritant in producing lymphocyte sheaths. In this case the irritant, the hemorrhage, probably acted chiefly as a chemical irritant, inasmuch as the sheaths were often somewhat away from the actual hemorrhagic extravasation. The sheaths were not found in portions of the brain far-removed from the hemorrhage, so the likelihood of their being the expression of a disease antedating the hemorrhage and responsible for the hemorrhage is not great. We look upon them, therefore, as being the result of the hemorrhage. Twenty-nine years of age is young for cerebral hemorrhage to occur, and the influenza three months before with its special tendency to hemorrhages has to be considered as a possible causative factor. The hemorrhage was evidently not quite recent. Possibly it may have occurred during the attack of influenza, death being due later to an extension of this hemorrhage, perhaps combined with the interference of function produced by the lymphocytic sheaths. The case is also of interest in connection with the supposed association of "nona" with influenza.

A. H. G., a male, aged 29 years, had had influenza three months previously, during which he had had chest signs. He resumed work and seemed quite well until about three weeks previously, when he developed headache and vomiting, and was delirious at night. He became convalescent, but on August 5, 1919, there was a recurrence of headache and vomiting, and he died on August 6. The post-mortem examination showed the presence of a large hemorrhage subjacent to and bursting into the descending horn of one lateral ventricle. Owing to the youth of the patient the brain was submitted for microscopic examination to see whether evidence of a new growth could be obtained. Sections showed a hemorrhage of some age and there were in its neighborhood marked perivenous lymphocytic sheaths.

ON A POSSIBLE SIGNIFICANCE OF THE BABINSKI AND OTHER PATHOLOGIC REFLEXES¹

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The Babinski toe phenomenon is looked upon as a pathognomonic sign of organic lesion of the pyramidal tract, or its point of origin. In order, however, to be diagnostic it must be demonstrated in undoubted fashion; *i.e.*, on stroking the sole of the foot there must be a slow and isolated dorsal flexion of the great toe. The stimulus applied must not be too great in order to eliminate complicating defense or withdrawal movements, and is best applied to the outer side of the plantar aspect of the foot. There are normal individuals who do not respond to stroking of the sole of the foot as the great majority of people do with plantar flexion of the toes, but show a more or less definite dorsal flexion of the great toe either alone or in conjunction with a similar movement of the other toes. But this response is usually much more swift and inconstant; it signifies infantilism in the sense that the cerebral flexion reflex has not the normal predominance over the spinal extension reflex. This pseudo Babinski is especially common in the neuropathic, in ductless gland disease and other degenerative conditions.

Simultaneously with the dorsal movement of the great toe there is a contraction of the tensor fasciæ femoris (Brissaud, Marie Foix), and of the hamstring muscles (Walshe). There is also frequently a fan-shaped spreading of the toes (*phenomene d'éventail*) seen especially in the infantile hemiplegias.

The Babinski phenomenon also occurs in the first stage of narcosis, in post-epileptic states, and in uremia. It disappears during deep anesthesia and comes on at once after the insult to the cortico spinal system. It is absent in transverse lesion of the cord, although this has been called in question recently. For example, Kausch has seen a positive Babinski in complete transverse lesion of the cord.

¹ Paper presented at a joint meeting of the New York Neurological Society and the Section in Neurology and Psychiatry of the New York Academy of Medicine, November 11, 1919.

He thought that dorsal flexion of the great toe originated in the cord, and that plantar flexion was due to the influence of the brain.

The Babinski reflex has no pathological significance in children under one year of age. Engstler always found extension in infants up to eight weeks, and in the second year 5 per cent. still showed extension.

The zone for reflex excitation of the Babinski sign is very wide, and there have sprung up a great number of modifications in the method of eliciting this reflex. I shall only mention the Oppenheim, Chaddock, Gordon and Crafts methods of obtaining the same end result (dorsal extension of the great toe).

There are other reflex manifestations frequently associated with positive Babinski, and apparently of similar significance. Rossolimo found that in pyramidal tract disease, striking the plantar aspect of the little toes produced plantar flexion and spreading of the toes. The Mendel-Bechterew reflex is exemplified in the same way but elicited through tapping the dorsal aspect of the fourth and fifth tarso metatarsal joints. One finds frequently also in pyramidal tract disease, the so-called Hoffman (sometimes called Klippe-Weil) reflex in the upper extremity. This consists in a grasping movement of the hand when the terminal phalanx of one of the fingers is pinched. Recently Mayer has described the loss of function of the opponens pollicis in hemiplegias. Whereas, in the normal, passive flexion of the metacarpo-phalangeal joint of the second or third finger produces opposition of the thumb and flexion of its metacarpo-phalangeal joint, these movements are absent in hemiplegia and in the newborn.

Viewing all that has been said in the light of adaptation to function, might it not be possible that all of these pathologic reflexes are an expression of an atavism? The human cortico-spinal system is, from the phylogenetic standpoint, one of the latest to appear; as a matter of fact, it is not yet myelinated at birth, but becomes so sometime afterward. May we not, therefore, say that lesion of the cortico-spinal system causes man to revert to the stage of the tree climbing monkey in whom there seems to be a dissociation between the great toe and the little toes, and in whom there is also very little opponens pollicis function? In climbing the monkey stems himself with his great toe in extension against the branch of a tree while clutching it with the remaining four toes in flexion; his hand is used very much after the manner of the Hoffman reflex in holding on with his upper extremity.

The presence of a positive Babinski sign in epilepsy and uremia

would be explained by the injury (perhaps only functional, if not anatomic) to the cortico-spinal system. The other phenomena associated with the Babinski sign—contraction of the hamstring muscles, of the tensor fasciæ femoris, the Rossolimo and Mendel signs—would seem to suggest a purposeful mechanism. The wide reflexogenic zone for eliciting these pathologic reflexes could most readily be explained on the assumption of adaptation to function.

In the adult reciprocal innervation² leads to the transformation of the extensor response to a flexor type. In strychnine poisoning where, according to Sherrington, reciprocal innervation³ is abolished, the more powerful extensors assume the upper hand, and Babinski has found in such cases dorsal extension of the great toe. In pyramidal tract disease, we may, therefore, assume also a loss of reciprocal innervation characteristic of the adult human. The fact, too, that the Babinski sign disappears in the child coincidentally with its learning to walk, is suggestive in this regard. The child, so to speak, moves forward phylogenetically at this time, advancing to the stage of locomotion in the erect posture. By means of reciprocal innervation he converts the extensor response now to a teleologically better suited flexor response. One can readily see how serious a handicap dorsal extension of the great toe would be under such conditions and how ill adapted it would be to the carrying out of this, evolutionally speaking, lately acquired function. The hypertonia of the newborn child too is readily explained by the fact that the tonus-accelerating cerebellum still has the upper hand. The cortico-spinal system, which is tonus-inhibiting, is not yet myelinated, and hence does not yet function fully. Whether the flexor flexion reflex of the English school of neurologists is concerned in the reflex mechanism discussed, I am not prepared to say, although the fact that the Babinski sign is an extensor phenomenon would seem to point away from this hypothesis.

There has recently appeared a paper by Brouwer⁴ in which he attempts to explain the phenomena of multiple sclerosis on a phylogenetic basis. His assumption is that those tracts and systems which

² The fact that an interference with reciprocal innervation might play a rôle was first suggested to me by Dr. H. C. Jackson, professor of physiology of New York University Medical School.

³ Reciprocal innervation, according to Sherrington, leads to coördinated movement through motor discharge in the agonists and simultaneous inhibition of the antagonists.

⁴ Brouwer, significance of phylogenetic studies for the neuropathologist, *Psychiatrische en neurologische Bladen*, Feestbundel Winkler, September 20, 1918. See this number of the *JOURNAL*.

(I have had access to Brouwer's paper through the courtesy of Dr. S. E. Jelliffe.)

are phylogenetically most recently acquired are the most vulnerable. In this way he explains the loss of abdominal wall reflexes, the speech disturbances, the nystagmus, the contrast between marked motor signs, and scant sensory changes, and the temporal pallor of the optic discs. He also found that in lesions of the median nerve the abductor pollucis brevis and the opponens showed the reaction of degeneration when it could not be demonstrated in the other muscles. In lower monkeys these muscles are poorly developed; hence their greater vulnerability. He apparently also is seeking a biologic explanation for observed phenomena, and, that, to my mind, is a desirable method of approach. Therein lies the value too of comparative neuro-anatomy.

It has been our notion that teleology plays a great part in medicine just as there is evidence of design in nature, and it is with this idea in mind that I present this hypothesis on an obscure mechanism in medicine. I recognize fully the inadequacy of this theory in places, and I should be very loath to consider it in any other light than that of an invitation to fruitful discussion.

74 E. 91ST STREET.

Society Proceedings

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING, OCTOBER 16, 1919

PUNCTURE OF CISTERNA MAGNA IN MENINGEAL BLOCK

DR. JAMES B. AYER described a method for puncture of the cisterna magna by which the cerebrospinal fluid spaces may be reached when meningeal block interferes with success in lumbar puncture. This is through the cisterna magna by introduction of a hollow needle through the occipito-atlantoid ligament. The procedure was proved practical by means of a cadaver and had been successfully used in several cases.

MEDITATIONS ON MORALE

DR. DONALD GREGG pointed out the control influence of the intellectual ideals as constituting morale and spoke of the illustration of this through the morale in the army. Here the cultivation of the intellectual ideals and the removal or mitigation of those conditions which tend to augment instincts and reactions are noteworthy. He seems to separate intellectual ideas and instincts rather than recognize that the instinctive life is the source from which intellectual ideas draw sustenance and power.

MEDICAL AND SOCIAL ANALYSIS OF DATA OF OUTPATIENT DEPARTMENT, PSYCHOPATHIC DEPARTMENT, BOSTON STATE HOSPITAL

DR. A. MYERSON recalled the fact that the point of view of psychiatry as a matter of the asylum has hindered actual diagnosis and treatment. Both must admit of wide possibilities. There is no fixed line of insanity or of other features as belonging to any definite psychosis or psychoneurosis. Commitment is only one therapeutical agent and in part a social and individual matter. An analysis of the statistics of the outpatient psychopathic department of the Boston State Hospital proved how individual were the problems presented. Certain types of patients were most frequently sent from certain sources, as for example, delinquency and illegitimate maternity from the social agencies.

HISTORICAL CAUSES OF THE PSYCHONEUROSES OF
THE JEW

DR. MYERSON laid emphasis upon the social heredity in the development of psychoneurosis among the Jews. The pressure brought to bear upon them had caused them to become urban citizens, tending to cerebral activity rather than motor, physical development of motor outlets. It had made them more clannish, more introspective, also more apprehensive. Social heredity can be more quickly altered as its workings are more quickly altered than that of biological heredity, which is being shown in the entrance of Jews into athletic life and change of other conditions mentioned.

PHILADELPHIA NEUROLOGICAL SOCIETY

REGULAR MEETING, OCTOBER 24, 1919

CASE OF A EUNUCH CONVICTED OF RAPE

DR. N. S. YAWGER illustrated through the case of a negro who had committed rape, although his testicles had been completely removed following an injury, that erotic desire may be retained under such conditions for many years. Literature in regard to stock breeding as well as statistics of human beings shows that late castration after sex gratification has been indulged in does not remove erotic desire and power.

A CASE SHOWING JACKSONIAN ATTACKS (STATUS EPILEPTICUS) WITH NECROPSY

DR. SAMUEL LEOPOLD reported a case of a colored woman who had suffered epileptic attacks for twelve years, which just before admission to the hospital amounted to several a day. She died the day after admission after two hours of continuous attacks. The convulsion occurred on the left side with clonic movements of face, arm and leg, with slight involvement of right ankle and foot. The pupils were contracted and their light reaction was gone. So were all other reflexes. There was conjugate deviation of the eyes to the left with the head turned to the left. The patient's movements were slow and coarse. Wassermann fluid reaction was positive. The patient was unconscious. Necropsy revealed a marked gummatous meningoencephalitis involving the right frontal lobe and extending to the precentral convolution.

A CASE OF ESSENTIAL EPILEPSY EXHIBITING SPECIAL FEATURES AND GREATLY IMPROVING UNDER OPERATIVE PROCEDURE

DR. ALFRED GORDON reported the case of a male of 32 years who in an unusually severe attack of epilepsy suffered a hemorrhage over Broca's area. Operation was undertaken because the resulting aphasia persisted, and disclosed the hemorrhage focus and was followed by several months improvement. Then indiscretion brought on another epileptic seizure followed by speech disturbance. In the succeeding two months there were no more attacks but some speech disturbance remained. The discussion brought out that this patient had been seen previously at the Philadelphia Hospital and the diagnosis of essential epilepsy with aphasia was disputed. Dr. Lloyd thought it rather a case of dysarthria.

A CASE FOR DIAGNOSIS

DR. S. F. GILPIN presented a case of interest in regard to compensation insurance. Following an accident a ship carpenter developed a condition which might represent paralysis agitans which might have been in the process of development when the fall occurred, or from his gait and general bearing and the fact that the tremors came on when observed or attempting motion it might be one of hysteria. Other possibilities were also brought out in the discussion.

A CASE OF POSTEROLATERAL SCLEROSIS ASSOCIATED WITH ANEMIA

DR. JOSEPH McIVER presented a case which showed a progressive condition of paresthesia with weakness and which spasticity of the lower limbs, marked ataxia, marked exaggeration of Achilles and patellar reflexes. The patient denied syphilis and the Wassermann test gave very indecisive results. The preservation of pain and tactile sensations with increased tendon reflexes in the early stages pointed to the early stages of combined sclerosis associated with anemia. There was much discussion of the case as to whether it represented a pernicious anemia or a secondary anemia associated with syphilis or with a posterolateral sclerosis.

Translations

THE HISTORY OF THE SYMBOL¹

BY MAX SCHLESINGER

TRANSLATED BY SMITH ELY JELLIFFE, M.D., and
LOUISE BRINK, A.B.

Introduction

He who should bring together into one little book all the symbolism of the learned would perform a task of no little skill.—Holzward.²

THE claim of importance which every intellectual worker makes in regard to his task is not difficult to establish for the theme that lies before us. For in fact if these researches completely fulfilled their purpose they would in a quite considerable degree increase the knowledge of the mental life, because in the last analysis they would have attained nothing less than the division of all experience into illusion and actuality, into being and seeming. Yet two sorts of difficulty still stand in the way, an objective one, because the present position of science still leaves so many things in semidarkness; a personal one, since the sum of all this, which might be exhausted for its scientific value, exceeds the mental powers of any one individual.³

Exact research goes its unwearied way in all territories, daily, step by step, with microscope and probe, number and measure, with pick and retort, dissecting knife and hypothesis, through history

¹ Geschichte des Symbols. Ein Versuch. Von Max Schlesinger. Leonhard Simion, NF. Berlin, 1912.

² J. von Radowitz, "Die Devisen und Motto des späteren Mittelalters," 1850.

³ A subject for a prize contest given out by the Academy of Sciences of Berlin in the year 1909 shows that a considerable importance is attached to the study of symbols by the leading circles of our intellectual world. The subject given was a critical research into the types and symbols of ancient oriental art, their origin, their spread, transformation, and significance among individual peoples. The winner of the prize was Hugo Priinz of the Kaiserl. Archäolog. Institut. The material for the work consisted of systematically arranged catalogues of fables of animals, astral symbols, deities in animal forms, gods or demons as subduers of animals.

and through speech spying out and comparing. And with all the tools which it creates for itself it erects an unshakable structure of truth.

"While already in the olden time there were singers for the deeds of the warriors, there are still wanting today competent historians in the field of the exact sciences and of technic."⁴ The way which we enter upon aspires to the same goal, namely to distinguish the symbolic, but it goes in the opposite direction. The knowledge which we impart tears down: earth and heaven, supposed relationships, the old world of fairy tales and dreams, so many imagined estates which have grown dear, which the spirit has accepted as of actual worth and has spread abroad everywhere. We look abroad over a place of ruins, upon which to be sure a high wall still rises, bright flowers bloom, stones of varied color glitter, a spot the ground of which still gives nourishment. Upon it man still prays to his idols, reverences still the customs which antiquity has sanctified.

To recognize the false in what is fancied worthy is the first step toward putting it aside. That which has lost its life force disappears, slowly indeed, but yet it gradually ceases to be a cause. Its condition of powerlessness often outlasts the period of its vigor. If it changes in such wise into symbol—and it would be an irreparable loss for mankind to lose its symbols—then it remains, retained not on account of its effects but for the understanding of the history of the folk, of society, of the individuals in their emotional and intellectual life, in what they do and what they suffer, in their hopes and disillusionments. It represents a large portion of human history not yet extinct.

As long as the symbol flourished the borrowed life hid behind its appearance. Its symbolic meaning was first recognized when the appearance was fading away.

History teaches that there were times in which the desire for the symbol was greater or less. It has lost in power and the present tears down everything in our civilization on which it can lay its hands even when it might better let it stand. Still many a root is yet uninjured. Everyday life itself builds new symbols; the folk, who tread the crowns of kings under foot, give new banners to the breeze. But supposing this to be the case, that all object symbols must yield to the enlightened understanding—just there always the mind takes refuge in supersensuous heights and enjoys felicity in such measure as reality and science are not able to give to it. If one set of cir-

⁴ L. Darmstaedter and R. DuBois-Reymond, "4000 Jahre Pionierarbeit in den exakten Wissenschaften," 1904.

cumstances leads out of the world of ideas into the lowland, the other, its feet set upon the simplest relationships, external, tangible, as well as upon the impulses slumbering in every human breast, awakens into a kingdom of superterrestrial completeness—and that also is symbol.

A thing of many kinds, of many forms and of many colors, that easily slips away if one does not seize it courageously, if one does not look it steadily in the eye.

We have put the historical presentation of our problem before the philosophical treatment, particularly to avoid the disquietude to which we should be led by the abundant and confusing bringing of material and examples out of all sorts of phenomena and from all times and lands. Of course the possibility presents itself here of building up into a system all that can be said about the symbol, which now is scattered throughout the whole work. This is a task which perhaps will occupy us later.

The arrangement of the material according to the chief life forms permits a survey of the fundamental facts in each one and the exalting out of the context the phenomena which appear there, which belong to the symbolism. It is easily possible with the help of the index to bring together the similar ideas and objects treated in the different chapters.

We have refrained from a methodical or encyclopedic treatment of the matter of symbolism because first a not inconsiderable number of older and more recent collections are in existence, even works of that sort from very recent times, and because further there is scarcely anything in the wide world that has not served as a symbol or might not have served as such.

In spite of the important scope of this work the reader will have gaps to complain of, to fill these out will be our constant endeavor. On the other hand the specialist who has command of some individual field will be referred to what has already been frequently stated. He may consider, however, that the material before us was not garnered for its own sake but merely to point out the coming into being, the existence and the expiration of the symbol in the elucidation of each period, to grasp the nature of the symbol. The bringing together into an organic form of the material which extends through layers wide apart, this problem must be solved first of all. In the full knowledge of the weaknesses which still adhere to this first attempt we comfort ourselves with a word of Harnack: "Every bringing together of material is the deed of the stout-hearted." Yet we would be unsatisfied if we had not fulfilled the

demand of Heinrich von Stein: "The truly human lies first in the putting of the material into form, in its rational presentation."

Furthermore this work will be only a building stone, at the best a corner-stone in the structure of the symbol, the erection of which is indispensably necessary for knowing the history of the mental life of man.

BOOK ONE

Introduction to Symbolism

THE HISTORY OF THE WORD SYMBOL

Every word has a double history, in the changes in its sound and its meaning.—Prellwitz.¹

One must accustom himself to see in every word history a monograph on the cultural history of mankind.—Mauthner.²

I

A word family has sprung from the Greek root word βαλ with verifiable ancestry richer than almost any human family can show and a family tree so genuine that no Heralds' College can controvert it. The etymologists go back still a long period of time before the beginning of the Greek language, like the mythologists of the ancient peoples, who traced back their royal lines to Zeus or another god or demigod, since they find in Sanskrit the original word *gal*. Also the Indo-Germanic onomatopoetic root *bal*, only once attested, is doubtless surely located.

The Greek family tree βαλ is rich in branches, each of which has in turn its history projected out into the most diverse lands and times.

We can trust ourselves at first to no better guidance than the root dictionary of the Indo-Germanic languages by Aug. Friedr. Pott.³ This gives all the unmistakable descendants of βάλλω and relates their experiences. It refers to the chief shoots and those nearly related, which as the branches and tendrils growing wild in a primeval forest do not seem to belong to one stem, yet arise from the one root and, in spite of the scarcely to be conceived multitude of varieties in meaning, belong to the one great word family.

Fick,⁴ Georg Curtius⁵ and others lend the weight of their names to belief in the origin of the root βαλ from the Sanskrit root *gal*, though Pott expresses doubt concerning it: *gal* to drop down, *vigal*

to pour forth, *galam* water (Lithuanian *galas* end, from *gal* disappear; Old High German *quëllan*, modern German *quellen*, to arise, to flow out.)

Since according to Curtius the frequent reference to water is to be observed, the suspicion forces itself that *gal* is to be carried back to the noise caused by water dropping or falling or flowing. While this in any case may be referred quite rightly to *quellen* perhaps we should also remember *gellen*, to sound loudly. This is confirmed by Karl Brugmann and Berthold Delbrück,⁶ who carry back the similar Old High German *klaga*, cry of distress, modern German, *Klage*, thus the pain which manifests itself loudly, filling the air, not that hidden within the bosom, to the root word *gal*. (Cf., however, 68.)

We will demonstrate the most ancient ancestor and circumscribe the territory through which we have to win our way. Then we will turn to the single family from which the word Symbol has taken its origin. We will cast a glance at the list of meanings, in order first briefly to learn to know the nearest relationship, as all lexicographic and many special scientific works bring these more or less in detail under the article *συμβάλλω*. Friedr. Creuzer⁷ groups these somewhat as follows:

Three chief meanings of the verb *συμβάλλειν* and *συμβάλλεσθαι* are at the same time the roots of a full number of ideas, which the Greek connected with his *σύμβολον*. First “*συμβάλλειν*, to unite, to bind together, to bring together what was separated,” then *συμβάλλεσθαι* and *συμβάλλειν*, with the dative of the person, “to encounter a person (in every sense), to have dealings with him, to make a contract”; finally “to compare one’s opinion with a given case, to conjecture, *conjectare*, to conclude, especially to seek to find out something puzzling, then especially used in the interpretation of divine oracles and prophecies.” The verb appears in Herodotus and Plutarch only in the passive form. Until 410 B.C. the Attic form *ξινβάλλειν* is used.

There is still to be added to the verbal forms mentioned by Pott, *συμβολατεύειν* of similar meaning.

There are some other interpretations to be discovered found under the Greco-Latin glosses, a collection of obscure, dialectal, obsolete words. They will be returned to later on.⁸

II

It is full of significance that the Greeks in general formed a substantive out of the verb *συμβάλλειν*. It shows that a word was needed

which should represent a thing or an idea, which found so frequent use that the paraphrasing through a sentence would become too circumlocutory. The German language has to make use of this round-about way to make itself understood because it has not formed a noun out of *zusammenwerfen*, to throw together.

The Greek language has not formed only one single substantive but indeed three, namely, τὸ σύμβολον, ἡ συμβολή, ὁ σύμβολος. The Latin, corresponding to the manifold relationship of both peoples to one another, has borrowed all three forms.

It must be observed that a period of at least three centuries lies between the first demonstrable use of the word in Greek and in Roman literature, for the never resting spirit of language almost an eternity. Perhaps the importance of this lies beyond the confines of our work.

The writing down of the Homeric poems, which employ the word in its different forms and meanings, may be set at about 750 B.C. or about 540 B.C. Yet more certain is the time in which Theognis, born at Megara about 540 B.C. employed it in his Elegies. It can be found from his time on in almost all of the Greek writers known to us. The great writers of tragedy and comedy, the bucolic poets, the lyric poets and writers of hymns, the historians and orators use it. To be sure the meaning of the word was not defined with the same exactness by all nor was it comprehended alike by all. Thus τὰ σήματα is found in Homer as the signs by which the husband and wife recognize one another again, for which τὸ σύμβολον was in general used by the later writers. Lysias and Theophrastus (in the fifth and fourth centuries B.C.) confuse the idea of commercial security and of money and call these uncritically σύμβολον.

It is not our purpose here to pursue separately⁹ the different usages by the individual Greek writers, but much rather to consider the many meanings and their changes during the period of Greek literature as a whole.

The use of the borrowed forms in Latin literature developed itself quite otherwise. The comedy writer Plautus (born about 254 B.C.) and Terentius (born about 185 B.C.) used it not infrequently, particularly the former, who further developed its meaning on the comic side. Afterward our word was taken into public affairs for use in many and varied directions, but in the period of the Roman classical writers (and purists?) which now follows it is never mentioned. Cicero (born 106 B.C.), who knew it, set it aside and employed for the different meanings of the word *collecta* and *nota*. It is much later when it appears again in literary usage, and this is in

Plinius (born 23 A.D.) and in Apuleius and Gellius in the second century A.D.¹⁰ In general, in relation to this word and its change in meaning, we may conceive of the Greco-Roman antiquity as an age of the same manner of thought.

All these words which have the same sounds up to the end syllable are radiations of one idea, but they were sharply distinguished from one another in the classical period. Later writers have first created misunderstandings through their confusion which a still later period sought to do away with.

The first formed and earliest used word was τὸ σύμβολον, and this is the only one that has attained a meaning which has extended itself beyond Greece and Rome and persisted even to our day keeping its place in the vocabulary of many peoples.

We must consider the use and significance of both other word forms in the Greco-Roman period before we turn to this.

(a)

Συμβάλλειν, with the meaning to bring together, to lead together, has formed the substantive ὁ σύμβολος. Homer uses it for one who achieves something, also for a mediator. Ebeling translates it transactor. In this sense it has entirely disappeared from literature in the period succeeding Homer.

Frequently the masculine form (latinized also as *symbolus*) is equalized with τὸ σύμβολον as a common form but only in a limited sense, namely, as sign, token, and in so far as this is accomplished through a ring, also signet ring and omen, and—in Rome at least—limited to the period preceding and following the classic.¹¹ In Greece the masculine and neuter were used with equal frequency by the best writers especially in the sense of knowing the future through portents.

The negative form ἀσύμβολος is derived from συμβολή and denotes one who participates in a feast prepared at common cost but who in the end does not contribute his share, a sponger.

Symbolus more frequently employed in the Middle Ages in the sense of chief town official, also councillor, is derived¹² from συμβουλεύω, and is therefore remote from our word.

The fishing tackle συμβολεύς mentioned by the Alexandrian grammarian Hesychius may trace its designation back to the fact that in dialect συμβάλλειν, [to bring together], is used with the same meaning as πλέκειν, [to weave or plait], perhaps compared with the plaiting (*Flechten*) of nets. Fishing with nets doubtless is meant in

contrast to fishing with a hook or other gear. Van Herwerden¹³ translates *σχοινιοσυμβολεύς*, the crank which winds the well rope and draws up the water, a plaiter of ropes [*Strickflechter*], or puller of ropes, might be a more literal and truer rendering.

The adjective *symbolus* is customary for *symbolic* or *allegoric*. Thus such grave stones which symbolically represented the calling and fate of the deceased, a custom practised from Homer's time, were called *symboli cippi* [tomb-stone signs].

No word succeeds to the stage of a transferred meaning until it has first passed through its previous stages of history in a sensuous and tangible world. It is often difficult to obtain an insight into these. So much more apparent is the correctness of the interpretation of the word, the nearer the original are the conditions into which we are able to transpose the word. We refer to Jakob Grimm: "Behind all the derived meanings of the word lies at its foundation a sensuous, obvious meaning, which was the first and original meaning at its discovery. It is its corporeal component, often intellectually covered over, extended, hidden and volatilized. All word interpretation, if it would prosper, must hunt it out and unfold it. . . . It is clear that moral or intellectual relationships or ideas come to exist out of the sensuous content of the word through its use. Gradually the sum of its derived meanings is deduced from them."

(*To be continued*)

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Riesman, D. HYPERTENSION IN WOMEN. [Journal A. M. A., Aug. 2, 1919.]

The author remarks that the habitual use of the blood pressure test has surprised him with the frequency with which it has revealed hypertension in women. Most cases occur among a definite class of women, usually stout, heavy, undersized multiparæ with no signs of syphilis, at the age of the menopause or just past it, of constipated habits, some suffering from intestinal indigestion. Up to a certain point, they show amazing tolerance of high blood pressure. The heart is usually enlarged, chiefly to the left. The arteries are soft, and even the retinal vessels seldom show involvement. The kidneys, so far as can be determined, are competent. This absence of gross renal or arterial changes has led some writers to call this type of hypertension "essential." A similar condition is sometimes seen in men, but in general it is less innocent. The points that stand out prominently in the etiology are multiple gestations, worry, constipation, flatulence and the menopause. Whatever the cause may be, whether of endocrine origin or toxic, the effect is an increased tonicity, gradually lending to a thickening of the vascular musculature. The inaugural symptoms are dizziness, tinnitus, dyspnea on effort, anginoid pains, palpitation, gaseous distension and vasomotor disturbances. Though several of these symptoms may coexist, the disease is often monosymptomatic at first, and in a large proportion of instances the complaints seem to have no relation to the hypertension. The patients are usually florid, practically always obese; the area of cardiac and aortic dullness is increased; a systolic murmur in the aortic area, transmitted upward and into the clavicles, and a ringing aortic second sound are common findings. In the later stages, a soft systolic murmur can often be heard at the apex. The temporal vessels are not usually conspicuous, though they may be tortuous. The peripheral arteries are soft, in contrast to the blood pressure, and a slight rise of temperature is almost constant. "The average age of the patient was 54. The youngest patient was 43, oldest, 71. The average systolic pressure was 211; the average diastolic pressure, 105; the average pulse pressure, 106; the highest systolic pressure, 310; the highest diastolic pressure, 160, and the

highest pulse pressure, 150." Of course, this is not the only type of hypertension in women. Chronic nephritis is a common cause, and cases in which the patients are less than 35 years old may generally be accredited to this cause and a worse prognosis be expected. There is also an arteriosclerotic group, and the hypertension in exophthalmic goiter and acromegaly. Riesman mentions, however, another type, similar to the one described, of thyrotoxic origin without goiter. While there is no positive proof of the thyroid cause, the symptoms suggest this origin; but, as against this supposition, iodids do not benefit, and may aggravate the condition. As regards prognosis, the essential hypertension may be called benign, but three accidents are possible and not uncommon. One is angina pectoris; another is apoplexy, usually left-sided, and the third, decompensation in the later stages. The treatment is practically avoidance of overinterference and regulation of diet, in quantity rather than quality, while drugs are of minor importance. The nitrites are not indicated in patients who do not suffer. Iodids may be used in small doses for long periods, and, lastly, Riesman has had strikingly good results in lowering tension by the use of corpus luteum. In thyrotoxic cases, rest is of the first importance, and tea and coffee should be forbidden. Everything must be done in all the types to encourage the patient to avoid worry. The author makes no mention of a thorough analysis of the causes of this worry.

Bircher, E. DUODENAL ULCER AND VEGETATIVE NERVOUS SYSTEM.
[Correspbl. f. Schw. Aerzte., 49, May 17, 1919.]

In two extensive articles on the surgery of duodenal ulcer there is much food for reflection for both neurologists and surgeons. Bircher's article in particular is particularly suggestive relative to the vegetative nervous system and its causative rôle in gastric and duodenal ulcer. He deplores that gastro-enterostomy has not answered all anticipations, and he ascribes this to neurotic factors. These he appreciates as neurotic but does not enter into the unconscious affective causes. The ulcer he shows seems to be the outcome of a vagotonic vicious circle formed by hypersecretion, retarded evacuation and pylorospasm. The gastro-enterostomy breaks up this circle as thyroidectomy breaks up the vicious circle in exophthalmic goiter. The pylorospasm is arrested; this improves evacuation conditions, and the pains may disappear completely at once. The question is whether it may not be possible to arrest the pylorospasm in some simpler way than by severing the vagus or the contracting muscle. That this can be done by a psychoanalytic procedure in the early stages is the claim of the modern psychopathologist.

Arteaga, J. F. HUNGER AND THIRST. [Rev. d. Med. y Cirugía, June 25, 1919, J. A. M. A.]

This article won the Gordon y Acosta prize for Arteaga. He dis-

cusses whether in the present status of our knowledge it is possible to determine the seat of the sensations of hunger and thirst, replying to his question in the affirmative. He explains that hunger and thirst are phenomena common to the cells of every living being as manifestations of the lack of chemical elements indispensable for the life of the cells. These trophic sensibilities of the cells may be unconscious in the lower animals but they become conscious phenomena as the nervous system of vertebrates becomes more highly developed. In man, hunger is manifested by painful contractions of the stomach, and thirst by dryness of the mouth and throat. These phenomena are purely reflex, the principal centers for hunger and thirst being in the medulla oblongata, but Auerbach's plexus is also involved, especially in relation to hunger. He discusses in detail the phenomena from lack of lime, etc., in man, animals and birds, and the way in which amphibious animals change their diet as they live in water or air.

Smith, M. I. AUTONOMIC DRUGS AND THE STOMACH. [Am. Jl. Phys., 46, 1918, 232.]

Pilocarpine causes contraction of all parts of the surviving stomach. *Atropine* antagonizes pilocarpine and relaxes. *Nicotine* causes contraction of all parts except the fundus and the cardiac sphincter of the cat and the antrum and body of the rabbit's stomach. *Adrenalin* causes mostly relaxation, but in the guinea-pig, rabbit, and dog, some parts may be contracted. The sphincters are always contracted by it. *Ergotoxine* causes those parts of the dog's stomach which are contracted by adrenalin to relax. The conclusion is drawn that the sympathetic innervation is wholly inhibitory in cat and man; inhibitory for certain regions, augmentator for others, in guinea-pig, rabbit, and dog. The sympathetic innervation of the sphincters is augmentor. [W. M. B., Phys. Abst.]

Bañuelos, M. CELIAC PLEXUS REFLEX. [Rev. Med. y Cirugía, March 14, 1919.]

Pressure on the celiac plexus, the author claims, modifies the rhythm of the heart and raises the arterial blood pressure. The respiration, pupils, and likewise the tone of the peripheral vessels are stimulated. The respiration is increased by five or ten inspirations per minute and the pupils dilate. The latter occurs more strikingly in sympathicotonic individuals. Vagotonics are not affected. This reaction is marked in hyperchondria, pylorospasm and gastric ulcer, and other vagotonic states.

Pagniez, P., Valléry-Radot, P., and Nast, A. TREATMENT OF MIGRAINE. [Presse Méd., April 3, 1919.]

These authors had noticed two years ago, in studying a case of giant urticaria, that ingestion one hour before meals of a small amount of the

food substance known to be causing the urticaria, entirely prevented subsequent occurrence of the latter. Subsequent experimentation with additional cases confirmed the original observation. The authors now report a successful application of the same principle to the treatment of a number of cases of severe, recurring headache, experienced likewise in conjunction with disturbances of the alimentary tract. Five histories are given of cases of migraine, of long standing ineffectually treated with all ordinary measures, in which, within a few weeks or days, upon ingestion of .5 gram of peptone in cachets one hour before meals, the headaches passed off for periods of several months. By a series of treatments, indeed, such patients could apparently be permanently freed of headaches which had rendered their lives burdensome for many years. The benefit obtained is seemingly to be accounted for on an anaphylactic basis, a small preliminary dose of a harmful substance tending to prevent its subsequent evil effects. As the peptone does not keep well in cachets, only a two or three days' supply of cachets should be prepared at a time. Care should be taken to secure a good specimen of peptone, those on the market being of very variable quality. In some cases the treatment is as complete a failure as it is strikingly successful in others.

Hardy, P. J., and Houssay, B. A. AURICULO-VENTRICULAR DISSOCIATION AND ADRENALIN. [*Arch. de phys. et path. gén.*, 17, 1918, 605.]

In cases of complete heart-block in a dog and in a man, the authors found that adrenalin caused an acceleration of both auricle and ventricle, without removing the block. The authors appear to regard this phenomenon as showing that adrenalin exercises a direct action on the muscle independent of the stimulation of the sympathetic nerves by it. They make no reference to the fact of its acting on the sympathetic myoneural junction. [*Phys. Abst.*]

Carrol, J. H. NEUROCIRCULATORY ASTHENIA. [*Am. Jl. Med. Sc.*, 158, July, 1919, J. A. M. A.]

In Carrol's opinion some types of hyperthyroidism are analogous to neurocirculatory asthenia, and their pathogenesis is probably identical, the phenomena being attributable to a hyperexcitability of the opposing set of fibers of the autonomic nervous system. In both conditions the syndrome develops in individuals in whom there is a hyperirritability of one or the other sets of fibers in the autonomic system. Hence, constitutional predisposition due to inherited sympathetic or vagatonic instability is a factor in the causation on a sound basis. Nervous and emotional strain is the immediate cause of susceptibility (acquired instability of the autonomic nervous system); infection plays a predominant rôle and the susceptibility in such cases may be accepted as indicating a chronicity of the infection with constant or frequent outpourings into the blood of the infective agent. There is a certain rationale for

believing that this instability in the autonomic nervous system lies in the element of anaphylaxis in disease in the predilection of anaphylatoxin for the parasympathetic system. There is some evidence that deficiencies of calcium in the diet may have played a part in the causation of some of the phenomena and that the higher plane of inorganic metabolism in the organism may have shared with epinephrin increase the responsibility in causation of the thyroid hyperplasia and hyperthyroidism among the soldiers.

Hartman, F. A., Kilborn, L. G., and Fraser, Lois. ADRENALIN VASODILATOR MECHANISMS. [Amer. J. Physiol., 1918, 46, 168-85.]

Dilatation of the hind-limb (cats and dogs) is produced by adrenalin acting on sympathetic ganglia and dorsal root ganglia of the nerves supplying that limb. Dilatation of intestinal vessels is produced by the drug acting on the superior mesenteric ganglion and on the dorsal root ganglia of the lower thoracic region. These results tend to support the view that the sympathetic contains dilator fibers for these regions. [Phys. Abst.]

Gunderson, E. INFLUENZA AND VAGUS. [Norsk. Mag. f. Laeg., 80, June, 1919.]

In a rigidly critical study this author maintains that the clinical picture of vagus disorders has been built up chiefly on a priori premises rather than on a careful study of the actual material. After an apparently mild attack of influenza, his patient, a medical student, developed daily attacks, lasting an hour or so, with acute pain in the cardia. It spread to the left shoulder, his heart stood still and then beat slowly and faintly. Pain in the stomach was also felt and the left epigastrium protruded. Similar attacks followed. The pulse dropped to 55, vision was impaired, breathing difficult, and polyuria were present. Bradycardia, pain in the heart, local meteorism, spasm in the pharynx, bladder, ocular muscles all occurred. Bromids and atropin relieved the condition.

2. ENDOCRINOPATHIES.

Mata, R. F. ENDOCRINE TYPES IN HISTORY. [Plus-Ultra, 2, Feb., 1919, J. A. M. A.]

Rodríguez Mata gives nine reproductions of famous paintings depicting dwarfs, cretins, the obese, and instances of excessive or deficient thyroid functioning. In addition to these, three full-page colored reproductions are given of Gisbert's Paolo and Francesca, da Vinci's La Gioconda, and Velazquez' Don Antonio. As the page of the *Plus-Ultra* measures 11 by 14½ inches, this issue is an imposing art number. Mata remarks that medical journals might well study the works of the masters as although they may misinterpret some of the special scientific features

of the case, yet they record psychic elements which may give the clue to the whole. He regards La Gioconda as an example of slight hypothyroidism, from the eyebrows and the doughy aspect of the face. The reproduction is from the earlier painting at Madrid, not the Louvre copy. Mata does not know of any painting depicting subjects with exophthalmic goiter, but in some which he reproduces, extreme terror or rage, is represented by protrusion of the eyeballs, as in Rubens' Battle between the Centaurs and the Lapithae. [Excellent material is also to be found in Richet, *L'Art et la Médecine* and Hollander's work along similar lines. S. E. J.]

Rogers, John. VEGETATIVE NERVOUS SYSTEM AND ORGANOTHERAPY. [Med. Society New Jersey, June 25, 1918, Medical Record.]

Rogers demonstrated that there was experimental evidence to prove that definite and prompt reactions could be obtained by the injection into dogs of certain materials derived from the thyroid and other endocrine glands. These reactions showed an intensification of either the activating or the inhibiting function of the different portions of the involuntary nervous system and seemed to be produced through the direct stimulation by the organ extracts of the terminal filaments of these nerves. The stomach was an organ in which the function of its vagus and sympathetic nerve supply had been quite clearly demonstrated and could be well arranged for study by means of a Pavlov or Janeway fistula. Experiments showed that the injection into an animal of the non-coagulable or "residue" portion of a saline extract of the thyroid increased a little more than in the normal dog the quantity and acidity of the gastric juice and atropine inhibited the flow. Adrenalin, after the destruction of the sympathetic, was inert. Tests made with nicotine seemed to show that this drug inhibited the gastric secretion through a paralyzing effect upon the vagus, but less actively than atropine. Residues of saline extracts of other organs were then tested, and it was found that only the entire pituitary acted like the entire adrenalin and apparently through stimulation of the inhibitory power exerted by the sympathetic. The thyroid, the parathyroid, the pancreas, and the spleen, all in different degrees, when the dose was standardized by its nitrogen content, seemed to intensify the activating power of the vagus. Tests of the effects of the thyroid on other organs, though not as complete as those upon the stomach, showed that only the "residue" of a saline extract of thyroid stimulated the flow of pancreatic secretion, apparently, as in the stomach, through the terminal filaments of its vagus nerve supply. It also increased the vigor of the contraction of both voluntary and involuntary muscle fibers, apparently through their nerve supply, and in kymograph tracings it was a vasodilator, but did not cause any appreciable increase in the pulse rate. Tests were then made with alcoholic and ethereal extracts of thyroid, and these were found to be fully

as active, if not more so, as the residue of the saline extract. If, however, the extracts were made from thyroid material which had been dessicated, like the commercial thyroid powder, the results showed that their activity was more or less impaired. After freezing, however, the organs could apparently be stored for a long time and the extracts would still be indistinguishable in their effects from those of the "fresh" organs. There was some substance which could be extracted from the thyroid with ether or alcohol, or with a slightly alkaline saline solution, but not with distilled water, which was capable of producing an immediate response in the dog's stomach and other organs. This non-coagulable material appeared to act through the terminal filaments of the vagus and not through the sympathetic, because its effects were prevented or inhibited by atropine and by section and degeneration of the vagus. Furthermore, when administered intravenously and the results noted in kymographic tracings, there occurred vasodilatation and no appreciable increase in the pulse rate. These reactions indicated that the only material capable of producing immediate physiological reactions which could be obtained from thyroid stimulated, not the sympathetic, as generally believed, but the vagus. In the stomach, at least, extracts of pituitary and adrenalin glands, and these extracts contained something more than adrenalin, seemed in different degrees to intensify the function of the sympathetic, while the thyroid, parathyroid, pancreas, and possibly other organs similarly in different degrees seemed to intensify the action of the vagus. If these observations could be confirmed and extended, then there was opened a new chapter in nutrition. When myxedema could be relieved or cured by thyroid feeding, the patient must first of all possess a certain minimum amount of thyroid epithelium which was capable of performing a certain minimum amount of normal biochemistry. If these cells were insufficient in number or had been damaged beyond some (unknown) point, then, both experimentally and clinically, thyroid feeding, although some temporary alleviation of symptoms might occur, was in the end ineffective. This meant that the ingested material, after its passage through the gastrointestinal tract and liver, must emerge into the circulation, probably as an iodized amino acid which could not perform the normal functions of the gland, but must first be absorbed by it as a nutriment and then be metabolized as thyroid product. Rogers made a practical application of these principles to various clinical conditions and more particularly to that large group of disorders in which the most constant and most important causative factor seemed to be fatigue.

Labbé, Marcel, and Vitry, Georges. ACTION OF THE THYROID GLAND ON GLUCOSE METABOLISM. [*Presse Méd.*, April 24, 1919.]

These investigators injected, intravenously, a solution of glucose into rabbits, then estimated the urinary glucose. The experiments were

conducted on sound rabbits, on thyroidectomized rabbits, and on rabbits fed with thyroid. Thyroid substance taken by mouth caused no appreciable change in the amount of glucose which the organism could fix. In thyroidectomized rabbits there was an increased glycosuria.

Kawamura, I. THYROID TRANSPLANTATION. [Jl. Exper. Medicine, July, 1919.]

Transplantation of the thyroid by means of bloodvessel suture gave the best results, particularly in restoring the glandular blood supply. The thyroids lived and functioned several months in dogs, but as yet transplantation to man cannot be said to be successful.

Tilmant, A. RELATIONSHIP OF EXOPHTHALMIC GOITER TO OVARIAN INSUFFICIENCY. [Presse Méd., March 27, 1919.]

Two prevailing theories of the origin of exophthalmic goiter, viz., the nervous and the glandular, are discussed by the author. Of these he believes the latter is by far the more important. The thyroid hypophysis, thymus, pancreas, and adrenals constitute the chain. If a change takes place in the internal secretion of any one of these organs, this change will react immediately upon the other glands in the chain. Hallion, Parhon and Golstein brought about thyroid enlargement by the injection of corpus luteum extract, while Schauta, Peter, and Tinay demonstrated the rôle played by changes in the ovarian secretion in the causation of exophthalmic goiter. Recently the author had occasion to study six cases of exophthalmic goiter occurring in women of the same family. Goiter was apparently transmitted congenitally among the members of one branch of this family. Altogether, of seventeen persons in the family, twelve had goiters, some exophthalmic and others of unknown nature. Four males out of seven, or fifty-seven per cent., and seven females out of ten, or seventy per cent., had goiter. In the six cases of exophthalmic goiter in females referred to, the symptoms of Graves's disease appeared in conjunction with periods of ovarian disturbance—chiefly insufficiency—either partial or complete, as in relation to the menopause. These observations appear to support an ovarian theory of exophthalmic goiter. There seemed to exist in this family a hereditary predisposition, transmitted by one branch, consisting of a special fragility of the thyroid gland. If a disturbance occurs in one of the other endocrine glands it reacts at once on the thyroid. Various causes may determine the appearance of irregular functioning of the thyroid, but the most important are toxic manifestations, acute or chronic infectious diseases, and hypersecretion or hyposecretion of the endocrine glands, acting through their or similar toxins.

Albo, W. L. THYROID INSUFFICIENCY IN INFLUENZA. [Prog. de la Clinica, 7, March, 1919.]

Two young girls, aged 11 and 10, respectively, had severe attacks of influenza with headache, sleepiness and a mild grade of amnesia. He interpreted these symptoms as due to a subacute thyroid deficiency. In one of these patients thyroid treatment improved the somnolency, the headache disappeared and the memory soon returned. The second patient yielded to the thyroid treatment so far as the headache was concerned, but the somnolency and the memory impairment persisted for three weeks at least. Influenza may exaggerate the function, at times, of the thyroid with symptoms of exophthalmic goiter.

McCaskey, G. W. HYPERTHYROIDISM. [Jl. Am. Med. Assoc., July 26, 1919.]

The basal metabolism and hyperglycemic tests of hyperthyroidism, more especially in regard to the mild and latent cases, are here discussed by McCaskey. The two pressing needs, at present are, first, the differential diagnosis of the borderline cases and the determination of the toxicity of goiter, and, second, the objective determination by the basal metabolism and alimentary glycemic tests. The basal metabolism is the most important of these, understanding by it "that minimal quantity of metabolic change essential to the neuromuscular and secretory phenomena of what might be called the basal and necessarily continuous functions—respiration, circulation and secretion. Rest and food abstinence approximately eliminate all other metabolic activities." The basal metabolism can be quickly and accurately determined by measuring in the fasting subject the oxygen consumption with a Benedict portable respiration apparatus. The average normal heat production, which is an accurate index of metabolism, is about 34 calories for men and 32 for women per square meter per hour under the conditions indicated. Physiologic variations of this are not over 10 per cent., and generally much less, and may occur in either direction. But in hyperthyroidism there is an increase up to 100 per cent. or more, according to the severity of the intoxication, varying according to the case, and in the same case at different times. There is also a diminished tolerance for carbohydrates with alimentary hyperglycemia, and also with glycosuria whenever the hyperglycemia exceeds the renal glucose threshold of the individual case. In every one of the thirty-one cases studied by McCaskey, the blood-sugar content was increased within two hours from 50 to 200 per cent. In 70 per cent. of the thirty-one, the maximal rise occurred at the end of the first hour, and a more or less sharp decline at the end of the second, thus showing that the crest had been passed. Exceptional cases, in which the rise was highest at the second hour, are explained by gastric hypomotility and slow intestinal absorption. "The failure of the hyperglycemia to rise proportionately and to bear any direct rela-

tionship to this intensity of the thyrotoxicosis metabolism suggests that it is an indirect phenomenon due, perhaps, to overexcitation of other organs, for example, the pancreas, which, in exceptional cases, fail to respond to the thyroid stimulation." Use of these tests will probably reveal a greater incidence of hyperthyroidism than has previously been recognized and will enable one to make a clear diagnosis between toxic and nontoxic goiters. While neither increased metabolism nor alimentary hyperglycemia are pathognomonic, together with clinical symptoms they can make a clear-cut diagnosis of the condition possible.

Frankau, C. OPERATION ON SIMPLE GOITER. [Br. Med. Jl., June 28, 1919, Med. Rec.]

Frankau considers the surgical treatment of simple enlargement of the thyroid gland by a review of fifty cases. Under the head of simple enlargement he includes the following: (a) Colloid goiter, a term which he prefers to parenchymatous goiter, since histologically the most marked change is increase of colloid with distension of the vesicles. A large proportion of the early "soft" cases are amenable to medical treatment, and operation should only be performed for definite symptoms or severe deformity, and for cosmetic reasons require careful consideration. The symptoms most commonly complained of are due to pressure on or dislocation of the trachea, a condition most likely to obtain if the goiter is asymmetrical or partly intrathoracic. Occasionally there is dysphagia. The most advanced cases of this type the author places in the next class. (b) Diffused adenoma. The pathology of this condition is a little obscure; some cases are definitely due to the presence of multiple small cystadenomata with little or no capsule to the growths, others appear to be result of fibrosis in a colloid goiter. The symptoms are nearly always those of dyspnea—especially at night and on exertion. The goiter in these cases grows to a very large size. Palliative treatment gives no relief, and operation is justifiable if the enlargement is marked, even if no symptoms are present. (c) Encapsulated cysts and solid adenomata. Of the 50 cases under discussion, 32 were of this type. The cysts are not infrequently multiple and may grow to a very large size. Usual symptoms are those of dyspnea; pain or dysphagia may occur, but are rare. Even if no symptoms are present, operation is advisable if the tumor is of any size, and particularly if it is situated in the isthmus. The most difficult and dangerous type of case is where the cyst is partly or completely retrosternal, when symptoms are much more severe and stridor may be marked. Any intercurrent respiratory diseases may easily be fatal, and in one of the author's cases sudden death from suffocation occurred as a result of hemorrhage into the cyst before operation could be performed. In five cases there was a history of rapid increase in size of the tumor with exacerbation of symptoms, due in every case to hemorrhage into the cyst. The author also points out the

danger of serious obstruction to respiration during operation. (d) Inflammatory affections. Inflammation of the thyroid is not common and suppuration within the gland is even more rare, but three cases of abscess in the gland have come under the author's care, in one of which death occurred from edema of the larynx before operation could be performed. Commenting on the operations, Frankau points out that the anesthetic has rightly been considered one of the chief dangers in thyroid operations and for this reason local anesthesia has been advocated. He states that in all his cases he has been fortunate in having the assistance of highly skilled anesthetists, and that he has always used general inhalation anesthesia. The anesthesia should be comparatively light throughout, so that return to consciousness is rapid. He has found the low transverse collar incision most suitable in the majority of cases, as it gives good access and, if carefully sutured, a very good scar. However, in small cysts or adenomata of the isthmus, which are often more accessible through a median vertical incision, and where the goiter is large and there is extensive prolongation upward toward the angle of the jaw, he makes an exception. Incision should be free to avoid the necessity of strong retraction, and superficial veins should be clipped and ligatured as soon as exposed. The sternohyoid and sternothyroid muscles can readily be retracted inward and outward and may be divided if additional room is required; division of the sternomastoid is never necessary. The fascia over the gland is next cleared, the veins being picked up and ligatured. The gland in its capsule is then isolated and the upper and lower pedicels identified and freely exposed, a step which is essential whether enucleation or extirpation is contemplated. In an enucleation the true capsule of the gland is incised, bleeding points being clamped and ligatured at once; the gland is then divided and the tumor enucleated by gentle finger dissection. In the case of retrosternal cyst, the upper part of the cyst should be cleared as far as possible and enucleation commenced from below and behind. The head should be kept raised so as to relax the trachea. In extirpation the vessels entering the upper pole of the gland should first be exposed and ligatured; the middle thyroid veins are then clamped and divided and the gland turned downward and inward so as to expose the inferior pedicel, which is ligatured through thyroid tissue. In cases of hemithyroidectomy, the author removes the entire isthmus, checking bleeding by figure-of-eight stitch. Drainage is required in all cases to avoid the formation of hematoma, which in addition to the prejudicial effect on healing may cause dangerous respiratory embarrassment from pressure on or kinking of the trachea. The author's experience has been that a $\frac{3}{8}$ -inch soft walled rubber tube with one side perforation near the end is the best. Suture of the incision should be in layers—that is, platysma and skin separately. A very abundant gauze dressing should be used, over which a pad of wool is applied and the whole fixed by a double figure-of-eight

bandage, and in order to prevent infection by vomited material the upper edge of the dressing should be sealed down by collodion. As to complications and sequelæ, severe bronchitis ensued in three cases of the series, wound hæmatoma occurred in four cases through using too small a drainage tube, and a persistent mucous fistula occurred in one case after enucleation of a cyst, due probably to a mild degree of sepsis.

Klinger. NEW IDEAS IN GOITER PROPHYLAXIS. [Correspondenz-Blatt für Schweizer Aerzte, April 26, 1919, Med. Rec.]

Klinger calls attention to inactivity along this line in recent years, a state of affairs much aggravated by the pandemic and the war. The attempts made in this direction have comprised the use of minute doses of iodine and the similar exhibition of quinine and silica. The Swiss temper has not invited a comprehensive plan of popular compulsory hygiene. In America something of the latter type has been tried out by Marine who gave two brief annual courses of sodium iodide to 1000 school girls with proper controls. It had been determined in advance that 56 per cent. of school children had some enlargement of the thyroid. The experiment was conducted in a locality in which goiter was endemic. The prophylactic experiment was supplemented by a similar plan of treatment of existing cases. The results, so far as treatment is concerned, showed that iodine has considerable power in the arrest and improvement of enlarged thyroid and that not a single case of Basedow syndrome was set up. Marine's work has shown that in all probability a similar simple wholesale campaign in a country like Switzerland would result in the prevention of much goiter. Fewer operations would be necessary and children's school attendance would not be interrupted. The problem is eminently one to be settled in school years. The teachers could be used to administer the syrup of sodium iodide (one is grotesquely reminded of the "brimstone and molasses" given to the pupils of "Dotheboys Hall"). The school physician would, of course, be the responsible agent for the treatment. A good system of records would have to be kept and this would entail some expense. Preparations to ward off all danger from careless administration would be necessary, for a few cases of iodism or hyperthyroidism might nullify the entire campaign.

Lévi, L. THYROID ENDOCRINE HYPERTHERMIA. [Presse Méd., April 7, 1919.]

Lévi asserts that this form of hyperthermia may occur in three types, viz., as a diffuse, continuous rise in temperature; as a localized rise in temperature, continuous or in "flushes"; as a false sensation of fever; or as a mild febricula, a fever running an intermittent course, or a prolonged fever with remissions. Vasomotor, congestive, and sensory disturbances, as well as changes in the sweat function and increased thirst, accompanying the hyperthermia. The latter occurs in nervous subjects,

in neuroarthritics, during rapid growth, in persistent juvenility, in the various Basedow conditions, in thyrotesticular cases, at any stage of the sexual life in females, and in some high pressure patients. The hyperthermia is due to hyperthyroidism, as is proven by animal experimentation, by alimentary thyroidism, by the presence of hyperthermia in exophthalmic goiter, and by the opposite condition—hyperthemia—met with in hypothyroidism. Ovarian and adrenal disturbances may also induce hyperthyroidism with consequent hyperthermia.

Swingle, W. W. IODINE AND THYROID. [Jl. Gen. Physiol., 1, 1919, No. 6.]

This paper tends to prove that the thyroid is a localized depot for the storage of a surplus supply of iodine which supplements the diffuse iodine supply of the tissues and hence acts as a stabilizer for the supply of this chemical element for its appropriate functions in the body.

Nicholson, N. C., and Goetsch, E. THE DIFFERENTIATION OF EARLY TUBERCULOSIS AND HYPERTHYROIDISM. [Canadian Medical Association Journal, June, 1919.]

Hyperthyroidism is responsible for the general symptoms usually attributed to tuberculosis in most of the cases where the presence of clinical tuberculosis is questionable, is the thesis here discussed, and also where the tuberculous lesion is thought to be insufficiently active to account for the severity of the symptoms. They divide patients hypothetically into three classes; those with frank tuberculosis, those with hyperthyroidism complicating tuberculosis, and hyperthyroidism only. Symptoms common to all three are fatigue, asthenia, loss of weight and strength, increased or normal pulse rate, nervousness, and possibly slight elevation of temperature. They make the differentiation by means of the adrenalin test, the technic of which must be read in the original, as the observance of its minute details is essential to success and it is consequently not suitable for abstract. The results obtained in forty cases are: In eighteen cases of questionable clinical tuberculosis the adrenalin test gave ten positive results and eight negative; in seventeen cases of inactive clinical tuberculosis there were nine positive and eight negative results; six cases of active clinical tuberculosis responded negatively to the test. Some of the positive responses were mild, others moderate, others marked. The constitutional hypersensitiveness to adrenalin is an indicator of excessive thyroid function and conclusions as to the degree of overfunction, which have a bearing on the treatment, can be drawn from the degree of the response.

Atwater, R. M. SCLERODERMA AND SCLERODACTYLY. [Am. Jl. Med. Sc., 158, July, 1919, J. A. M. A.]

This case presented by Atwater possesses many characteristics of

the disease in its usual form. The associated sclerodactyly appears quite typical of those cases previously reported in which roentgenographic studies of the bones have been made. There is a characteristic atrophy, absorption and eventual disappearance of the terminal phalanges most commonly in the hands and sometimes in the feet.

du Castel, J. SKIN AND EXOPHTHALMIC GOITER. [Paris Med., 9, May 10, 1919.]

Various dermatoses which may be associated with hyperthyroids are here taken up by the author. Vasomotor, trophic, toxic and microbial complications are fully discussed. Chronic or recurring pyrodermatitis or eczema are frequently precursors of a frank attack of exophthalmic goiter. He directs attention to the soil in true mechanistic fashion, but is oblivious to the influence of affective disturbances as causes of the exophthalmic goiter as well as the dermatoses.

Pincherle, M. PITUITARY DEFICIENCY. [Rev. d. Clin. Pediatri, 16, July, 1918. J. A. M. A.]

Pincherle gives seven pages of bibliography, and tabulates 116 cases from the literature in which the effect of pituitary treatment was recorded, as also seventeen reports on experimental lesions of the pituitary body. Comparing all this testimony with his own clinical experience amply confirms the connection between abnormal polyuria and backward physical development and pituitary insufficiency. Corroborating minor signs are the effects of pituitary treatment, the extreme tolerance for carbohydrates, the abnormally small sella turcica, anomalies in ossification, and Cushing's thermoreaction, low blood pressure, asthenia and drowsiness. In some of his cases only some of these minor points were evident, and he classifies them as "masked pituitary syndromes." They are important for research on the endocrine system, but the chief importance of their discovery lies in the possibility of improvement and cure under organotherapy. In one of his patients the arrival of puberty was accompanied by considerable development of fat, and menstruation was seriously irregular while some of the sexual characters were abnormal. Pituitary treatment in his cases reduced the excessive diuresis and polydipsia, but did not seem to modify durably the diabetes insipidus. The children increased in height and weight, but not all the signs of backward physical development subsided. Enough were modified, however, to encourage further experiments in this line with great promise. In all his cases albuminuria could be induced by forced lordosis, which indicated a low resisting power on the part of the kidneys.

Abel, J. J., and Kubota, S. HISTAMIN IN THE HYPOPHYSIS. [Jl. Pharm. and Exp. Therap., 13, June, 1919.]

This is a chemical study which seeks to determine the presence of

histamin in the hypophysis. It is a substance which, in very minute doses, stimulates unstriated muscle. It also depresses the heart action, and causes prostration when given in large doses. It is a widespread protein in plant and animal tissues and a regular constituent of the average food. It may play an important rôle, they believe, as stimulant for the gastric and intestinal musculature and also as a dilator of capillaries during digestion.

Larson, J. A. THE FUNCTIONAL CORRELATION OF THE HYPOPHYSIS AND THE THYROID. [Am. Jl. Physiology, 49, June 1, 1919.]

Workers have for a long time emphasized certain resemblances in structure and function between the hypophysis and the thyroid gland. If the extirpation of one gland causes changes in the structure and function of the other, there is ground for suspecting that there exists a functional reciprocity between the two.

The literature is reviewed wherein the effects of hypophysectomy upon the thyroid or the changes in the pituitary due to thyroidectomy are emphasized. The meager experimental evidence upon the removal of the hypophysis appears to point to a resultant diminution in size of the thyroid. On the other hand the effects of thyroidectomy upon the hypophysis are much more definite. The preponderance of clinical and experimental evidence shows a marked hypertrophy of the hypophysis as a result of thyroid deficiency. The hypertrophy is usually allocated to the anterior lobe.

Hypertrophy of the hypophysis following thyroidectomy has by many investigators been considered evidence of a vicarious relationship between the two glands. If it be assumed that the hypertrophy of the pituitary is physiological rather than pathological the question arises as to what extent the hypophysis can function for the thyroid. That the substitution as it exists, is incomplete, is shown by the myxedematous symptoms and often the death of the animal following thyroidectomy. This incomplete compensation might be due to the inability of the hypophysis to play its double rôle successfully; that is, to perform its own functions and to supply an autocoid capable of taking the place of the active principle of the thyroid. If this be the case the administration of pituitary substance might very well make the substitution more complete.

Fresh anterior lobe of the ox pituitary was administered to thyroidectomized and normal rats. An analysis of the data furnished by the experiments indicate that the administration of the anterior lobe of the hypophysis exerts a beneficial effect upon thyroidectomized rats. The action of the pituitary substance not only ameliorated the condition of the operated rats but actually lengthened the life of the animals. The favorable influence of the pituitary was also seen in the case of the normal rats where the coats and condition of nourishment were improved.

The results are capable of more than one interpretation. They might indicate a direct functional substitution of the hypophysial substance for the thyroid principle, or a beneficial action upon the organism as a whole. The former possibility has been emphasized and objections to this explanation of the results have been answered. These experiments are now being repeated on a much larger scale. [Author's Abstract.]

Climenko, H., and Strauss, I. EUNUCHOIDISM. [Arch. of Neur. and Psych., 1, June, 1919, J. A. M. A.]

Four cases of congenital eunuchoidism, three of which can easily be put into the class of status lymphaticus are reported by Climenko and Strauss. The first case gave clinical symptoms of apoplexy into the cord, a condition hitherto unreported, although apoplexies into the brain have been known to exist. The third case shows a sella condition that is also very rare and is contrary to the belief that in the eunuchoids the sella turcica is enlarged. It probably illustrates the fact that our judgment of the function of the pituitary must not be based on the size of the sella as evidenced through the roentgen-ray appearance. The fourth case is a mixed type of eunuchoidism with characteristic fat accumulations and strongly suggestive of status lymphaticus. In this case also the sella turcica was rather small. The second case is in a class by itself. The patient resembles the anthropoid much more than does the average human being. His skeletal frame looks as if it belonged to an intermediary stage between the human and the anthropoid. His intelligence is low.

Macht, D. I., and Matsumoto, S. OVARIAN AND CORPUS LUTEUM AND PUPILLARY ACTION. [Endocrinology, 3, 1919, No. 2.]

Corpus luteum extracts, when dropped in the eye of a frog, produced dilatation of the pupil in about one half hour. Ovarian extracts were found to produce little change in the pupil. The difference between the effects of these two bodies in the pupillary mechanisms is so great as to lead the authors to regard these two substances as being different.

Matsumoto, S., and Macht, D. I. OVARY AND CORPUS LUTEUM EXTRACTS. [Urology, 3, April, 1919.]

The action of fresh and desiccated ovary and corpus luteum was studied by Matsumoto and Macht on the bladder, uterus and fallopian tubes, vas deferens and seminal vesicles of various animals. Corpus luteum extracts have very little effect on the contractions and tonicity of the excised bladder or ureters. Corpus luteum extracts exert a very stimulating effect on the excised uterus and fallopian tubes, but their action on these organs is not specific as the same effects are produced by administration of extracts of all kinds of glands. Corpus luteum

extracts exhibit a markedly stimulating action on the excised vas deferens and the seminal vesicles are stimulated by doses of corpus luteum extracts. In respect to their effect on all the genito-urinary organs studied, ovarian extracts exert a very much weaker action than corpus luteum extracts. The peculiar and sensitive reaction of the vas deferens of the rat to the effects of corpus luteum extracts is, physiologically speaking, proportional in intensity to the doses of the drug used, and runs parallel to the effects of the same extracts on the blood pressure and on the pupil of the frog's eye. It therefore offers a convenient method for the assaying of corpus luteum preparations on the one hand, and for the testing of physiologic activity of various chemical derivatives of the corpus luteum on the other. [J. A. M. A.]

Pézard, A. SECONDARY SEX CHARACTERS IN BIRDS. [Bull. Biolog. France et Belg., 1918, 176, Phys. Abst.]

This thesis records the effects which follow the removal of the genital organs, or their transplantation, in cocks and hens. Excision of the testes of a young cock prevents the development of certain secondary sexual characteristics, such as the comb and gills, which remain small, pale, and bloodless; the cock also neither crows nor shows any signs of the possession of sexual instincts. Castration does not have any effect on the development of the plumage or spurs. When castration is delayed until the adult stage is reached, a similar relation between the testes and the secondary sexual characteristics can be traced. The plumage and spurs of the castrated cock are unchanged, but an immediate degeneration of the comb and gills sets in which is followed in a few days by loss of sexual instinct and ability to crow. The author finds that the degeneration of the comb occurs in accordance with a simple law which is expressed by a mathematical formula. The normal characteristics may be restored to the castrated cock by the transplantation of testicular tissue from another cock, or by the repeated injection of an aqueous extract of the testis of a pig. The comb grows rapidly, the sexual instinct reappears, and the cock crows again. A very small portion of transplanted tissue suffices to effect this result, and when the operation is successful, the normal characteristics are completely reproduced. The result is never partial; it is a case of "all or none." The efficacy of the pig's testicular juice demonstrates its physiological as opposed to its zoölogical specificity. The normal characteristics are only retained in the castrated cock receiving the injections of testicular juice so long as the injections are kept up; as soon as they cease, degeneration rapidly occurs. The effects are ascribed to a hormone elaborated in the testes or possibly in the seminal tubules. The origin of those secondary sexual characteristics which are not determined by the testicular hormones is indicated by the results of experiments on hens. Immediately after the removal of the ovary from a hen, spurs begin to

grow and a metamorphosis of the plumage sets in, which after some months becomes similar to that associated with the cock. Apparently a hormone is secreted by the ovary which suppresses in the hen these secondary sexual characteristics of the cock. To effect sexual inversion, it is therefore necessary to extirpate the genital organs and then introduce the tissue of the genital organs associated with the other sex. Attempts to experimentally produce this inversion have not been very successful, but it has been found possible to arrest the growth of the spurs in the cock and cause the rapid growth of the comb in the hen. Experiments are also described which indicate that the accumulation of fat which follows castration is due not to an increased production of fat, but to a failure to utilize it. Normally, it appears that fat is prepared in the liver for the purposes of the body under the influence of the gonadal hormones. The liver of the castrated animal, no longer doing this work, diminishes in size.

Lehmann, K. PSEUDOHERMAPHRODITISM. [Ugesk. f. Laeger., 81, May 1, 1919.]

This is an interesting genealogical analysis of a family in which a female pseudohermaphroditic infant, who died of cachexia, furnishes the initial point of investigation. A male cousin of the mother was a pseudohermaphrodite. One of the brothers of the patient had hypospadias and cryptorchidism. In a case of pseudohermaphroditism reported in Danish literature malformation of the external genitals was observed in three of the other six children. The boys all died in infancy chiefly cachectic. All these children seemed to be well developed at birth, save for the genital anomalies, but these died in a few weeks. Neugebauer had made a compilation of 1,250 cases of pseudohermaphroditism, 61 were less than a month old and 50 per cent. of these had died, as also 33 per cent. of the 93 other children under 10 years of age. The complete atrophy of the thymus suggests that the condition of the external genitals is accompanied by modifications in the polyglandular relationships. Treatment with thymus might help these children.

Pearlman, I., and Vincent, S. FUNCTION OF CHROMAPHIL TISSUE. [Endocrinology, 3, 1919, No. 2.]

A study on vascular distribution as a function of the chromaphil tissues of the body.

Gley, E., and Quinquaid, A. ADRENAL FUNCTION. [Arch. de phys. et path. gen., 17, 1918, 807.]

The arterial pressure remains at its normal height for some hours after removal of the suprarenals, provided that care is taken not to injure the splanchnic nerves. The rise of blood-pressure on stimulation of these nerves is not decreased by removal of the suprarenals, nor is

the effect of asphyxia diminished. Although adrenalin can be shown to be present in notable amount in the blood of the vena cava below the diaphragm during stimulation of the splanchnic, it is present in the blood of the right heart only in amount too small to possess any physiological action.

Gruber, C. M. EPINEPHRINE AND MUSCULAR WORK. [Endocrinology, 3, 1919, No. 2.]

The general deduction from this study is that adrenalin seems to have some specific action upon the muscle tissue which overcomes fatigue, rather than such benefit being due to the improvement in the circulation.

Stewart, G. N., and Rogoff, J. M. NICOTIN AND THE ADRENALS. [Jl. Pharm. and Exp. Therap., 13, 1919, No. 3, J. A. M. A.]

The predominant and by far the most durable action of nicotin, whether administered intravenously or hypodermically, on the epinephrin output Stewart and Rogoff point out is a depressant or paralyzing action. The maximum diminution of the epinephrin output is rather rapidly reached and then there is a more gradual recovery, which when the dose is not too large, proceeds till the original output is approximately attained. At the time of maximum depression no epinephrin at all may be detected in the suprarenal vein blood by the test objects chiefly employed (rabbit intestine and uterus segments). The depressant action is preceded by a transient stage of excitation, lasting, as a rule, in these experiments not longer than from half a minute or less to a minute. In this stage the rate of epinephrin output is markedly increased (from two or three to ten or fifteen times the original output or even more, under our experimental conditions). The latent period of the transient excitation, with intravenous injection of the drug, is very short. In some of the experiments there was evidence that it could not have exceeded a few seconds. The brief stage of excitation passes rather abruptly into the much more durable stage of depression. The maximum increase in the rate of epinephrin output is followed at a relatively short interval by the maximum depression of the rate, after which begins the gradual recovery. The changes in the rate epinephrin output are roughly parallel to the changes in the blood pressure caused by nicotin, indicating that when the sympathetic ganglion cells on the afferent vasomotor path are being stimulated or depressed, a corresponding stimulation or depression is being exerted on the efferent suprarenal secretory path. The nicotin effect on the epinephrin output is, speaking generally, the converse of the strychnin effect. The nicotin action develops more suddenly than the strychnin action.

Bernard, A. REACTION TO EPINEPHRIN IN HYPERTHYROIDISM. [Prog. Méd., 34, May 10, 1919.]

In hyperthyroid states there is some special susceptibility to adrenalin by the sympathetic vascular effectors. Epinephrin in 0.5 mg. doses will cause tachycardia and raise the blood pressure. This reaction is valuable in testing out potential hyperthyroid cases. Many of these show on microscopical study small adenomata. The positive reaction to epinephrin calls for exploratory operation at least with microscopical examination of the excised bits.

Zimmern, A. RADIOSUSCEPTIBILITY OF THE ADRENALS. [Bull. de l'Acad. de Med., 81, June 10, 1919.]

This investigator reports he has been able to expose successfully the adrenals to X-ray action and thereby produced retrograde changes in these organs of such a degree as to reduce hyperfunctioning, thus reducing high blood pressures without any deleterious effects upon the skin or the kidneys. The fall in blood pressure in some of his patients has persisted several months at least.

Morquio, L. PINEAL TUMOR. [Arch. Lat. Amer. d. Pediatria., 13, 1919, No. 2.]

A boy twelve years of age began to complain of headache and then had further meningeal symptoms suggestive of a tuberculous meningitis. After a rapid course the autopsy showed a sarcoma of the pineal.

Del Campo, E. THYMUS FUNCTION. [Zeit. f. Biologie, 68, 1919, 285.]

The specific effect of thymus extract in relieving the fatigue of frog muscle was also demonstrated for the soleus muscle of the rabbit narcotized with urethane. Long series of muscular twitches were recorded by Kronecker's method—the rate of stimuli being 1 every 4 seconds. After the initial staircase effect the height of the contractions was maintained for long periods before the linear descent characteristic of fatigue. The appearance of the latter was checked or completely removed by the intravenous injection of thymus extract or thyroglandol. Other nucleoproteins were inactive, indicating the specificity of thymus extract. The motor end organ was the site of the action, for the muscle on direct stimulation evinced no fatigue.

Naegeli. OSTEOMALACIA AS A PLURIGLANDULAR SYNDROME. [Münch. m. Woch., 1918, No. 22.]

The author explains osteomalacia as pluriglandular disease. In connection with this he points out in a condensed systematic review the great and many-sided involvement of the different organ systems. In the skeletal system may be observed constitutional inferiority, hyper-

plasia of the bone marrow decalcification, softening and bending of the bones, enormous sensibility of the periosteum. The muscle system shows dystrophy with functional weakness and, probably as a consequence, fatty degeneration almost to total lipomatosis. In the nervous system may be mentioned psychic disturbances, exaggeration of reflexes, spasms, tremor, high pulse rate, disturbances of the temperature center in the oblongata, sweating and paresthesias. Metabolism is also altered. The disease is usually found in people of poor constitution. Mineral metabolism is seriously affected in advanced cases and so also in the metabolism of albumin and fat. Alteration in blood formation is manifested in changes in the bone marrow whereby hypofunction follows upon an incipient hyperplasia. In the early stages polyglobulin may be observed, in late cases severe anemia. In one portion of the cases leucocytosis exists, more often with abundant myelocytes. Further, there is present eosinophilia and lymphocytosis, further changes in the albumin-globulin relationship in the serum with increase of the globulin. In the anamnesis chlorosis is discovered more often than not. The organs of inner secretion are likewise more or less involved. There are anatomical changes in the hypophysis, which have not been proved so far. The author observed in one man hypophyseal obesity with nanism. Relation to hyperthyrosis which have been affirmed appear doubtful. The epithelial bodies are frequently hypertrophic. A case of diabetes points to a disturbed pancreatic function. The very strong pigmentation observable in some people must be brought into relationship with the adrenals. Hyperfunction of the reproductive glands has been shown to be beyond question by the effectual results of the Fehling treatment by castration.

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Kennedy, R. PROGNOSIS OF NERVE INJURY. [Lancet, July 5, 1919.]

Kennedy draws attention to the length of time required for the functional recovery of nerve injuries, the reason being two-fold: the occurrence of nerve degeneration after all but the most trivial injuries and the necessity of nerve regeneration before conductivity is regained, and the degeneration in the muscles supplied by the damaged nerve. This degeneration of muscles takes place with great rapidity, and is such that the muscle cannot become functional again until it has regenerated and this restoration cannot begin until the nerve has already regained its conductivity. Then there is the difficulty of keeping the case under observation long enough—usually for several years—to estimate properly the prognosis. In nerve injuries many factors enter into the prognosis. (1) Sepsis or asepsis. Sepsis, though one of the most unfavorable factors, is not a complete bar to recovery, but it is apt to lead to changes in the nerve trunk and its surroundings, resulting in the formation of

cicatricial tissue and permanent damage to the nerve trunk. In the war, most cases were associated with sepsis, in contrast to those seen in civil life, and consequently recovery was more rapid as a rule in the latter. Absence of sepsis, however, does not mean assured recovery, as, for example, in cases where there is no open wound but where the nerve was cut by sharp fragments of a fractured bone or has been ruptured by tension. (2) The nature of the damage to the nerve trunk. This may vary between slight compression by a cicatricial band and extensive loss of nerve substance. In general, compression is regarded as more favorable than severance, yet the results of the two types are practically the same. (3) The surroundings of the damaged nerve trunk. This is important since, even though the nerve may be in a condition for recovery, the development of a mass of densely contracted cicatricial tissue makes recovery impossible, and this is particularly true in the case of the ulnar culcus and the aqueduct of Fallopius. (4) Amount of trauma. A clean cut of course gives a better prognosis than a laceration, the harmful effect of trauma being due to the reaction in the tissues, in the nerve itself, and in the surroundings, leading to development of cicatricial tissue, and ultimately compression. (5) The nerves injured and situation of the injury. Prognosis is less favorable in injury of some nerves than in that of others. Injuries of the facial nerve are difficult to repair. Injury of the aqueduct is practically impossible to deal with because of the surroundings of bone; also if injured in its course in the parotid its repair is very unfavorable because of the salivary gland, while beyond the parotid the tenuity of its branches is against the chances of a favorable reunion. In general, up to a certain size, the larger the nerve trunk the more likely is the result to be good; the larger trunks are more easily found with less damage to tissues, and the interval between the ends is less in proportion to the thickness. Again, the same nerve has a better prognosis in certain situations than in others; for instance, the ulnar nerve has its worst prognosis when wounded in the course of the ulnar sulcus unless operative means are adopted to overcome this. The lapse of time between injury and operation is also a factor of great importance. The progressive atrophy of muscle is the most serious factor of a nerve lesion. Changes take place in the muscle which almost immediately affect its electrical reactions; it retains its responses to galvanic stimuli, but continues to waste and recovery of motion will not occur until the muscle is restored to a condition in which its electrical reactions are normal. Recovery of faradic irritability is, as a rule, the immediate precursor of voluntary contraction. Delay in operation usually means more protracted recovery. In considering the relative advantages of primary and secondary suture, it may be said that other things being equal the advantage lies with primary suture. In the war, however, the wound has been lacerated and infected in most cases, and therefore not in a condition for primary suture, which has resulted in failure. In any

case, unless there is proof that the nerve is reuniting, secondary operation should not be postponed more than four months. Experience has shown that cases operated upon within three months, when primary suture has not been done, give a commencing recovery in the muscles in three and a half to four months, whereas those not operated upon for five or six months do not show any improvement for seven or eight months. When operation is done only after long intervals, recovery is so remote and so gradual that it is difficult to say when it has commenced, but even after long periods there is a possibility of obtaining good results. In regard to factors occurring at operation, the author points out that a higher standard of aseptic technique is required than in the case of other branches of operative surgery, the reason being that we are dealing with the regeneration of one of the highest types of tissue cells, inferior to connective tissue cells in regenerative capacity. Particular care should also be taken to avoid force or coarse manipulative handling. In coapting the nerve ends, there is danger of rupturing the fibers if too great tension is exerted. If the ends do not quite meet conductivity is resorted to in some cases. Excising a segment of bone so as to shorten the limb and bring the nerve ends into contact requires so much manipulation that prognosis is unfavorable. The suture must be carefully chosen in view of its capacity to be encapsulated by the tissue or absorbed, so as to cause the least irritation, and the smallest possible amount of foreign material should be used. Prognosis is poor in cases where the sutured or liberated nerve has unavoidably been left in a bed of scar or in a bony canal or furrow. Post-operative factors may also affect prognosis. Contraction of antagonist muscles can be prevented by appropriate fixation or passive movements, and attention to this is particularly necessary in cases of delayed recovery. In cases in which sensation was present after receipt of the wound, but was lost gradually at no great time after the injury, it will usually be found that the nerve is not divided but compressed in cicatrix. Overwork of muscles must be avoided on recovery. The author appends the results of a series of 25 cases which have been observed for a sufficiently long time, in 18 of which there was complete success, *i.e.*, normal function was restored, and in 11 of which there was partial success, *i.e.*, recovery was sufficient to give distinct improvement; failures, *i.e.*, cases in which no useful recovery resulted, were nil. [Med. Rec.]

Petrén, K. SYPHILITIC OR MERCURY POLYNEURITIS. [Reprint, 1918.]

A very definite contribution toward one seriously important question in practice is made by Karl Petrén in regard to the disputed question whether the mercurial treatment of syphilis is responsible for a subsequent polyneuritis, which may, as in the case reported, prove fatal. Petrén gives at length the clinical history of the patient under consideration as it appeared after he entered the medical clinic of Upsala, where

the writer of this report was then professor. The patient presented himself because of great pain in the legs and with a history of a syphilitic eruption which had appeared three months earlier. He had received at first at least six injections of mercury, one dose a week, in what form could not be ascertained. Later he had received four or five more injections, the last having been administered two weeks before his entrance into the clinic. The pain had been felt a month after the beginning of treatment. Since this pain was the dominating symptom and there were no other signs of mercurial poisoning the physicians then in charge of the clinic resumed the injections of mercury and reduced the interval between the second and third series of injections to two weeks but the treatment was stopped when it was found that the patient's condition was becoming worse. Polyneuritic symptoms gradually developed until the patient died at the end of two months. Among these were cachexia and a nephritis moderate in degree but of a character found elsewhere in mercurial poisoning. The chief symptoms were those pertaining to the peripheral nerves and there was a marked trembling of the limb also characteristic of mercurial poisoning. Stomatitis also became evident and the presence of mercury in the urine added its testimony to the diagnosis of polyneuritis due to mercurial poisoning. The question which arises as to whether death was due in this case to polyneuritis caused by the syphilis or by the effect of the mercury is fully discussed in the light of other experience in the writer's practice as well as of the literature upon the subject. He feels convinced that the case under consideration owed its fatal outcome to the latter cause. The danger in the administration of mercury he conceives lies in the too brief intervals existing between the injections of mercury particularly if it is given in insoluble form. He emphasizes the importance of the danger since so often to-day mercury is given in a doubtful case either to produce a cure should the case prove one of syphilis or in order to establish the differential diagnosis.

Rovsing, T. CERVICAL RIB. [Hospitalstidende, 62, May 28, 1919.]

Details of four case histories in which cervical rib was removed for various pressure syndromes varying from neuralgias to cervical scoliosis, with atrophies of the brachial plexus muscles, vasomotor disturbances etc.

Platt, H., and Brentnall, E. S. FARADIC STIMULATION OF NERVE AND MUSCLE DURING OPERATIONS. [Lancet, May 24, 1919.]

These observers strongly urge the employment of the faradic current for stimulation of both nerves and muscles during operation, since by this means the divided nerves can be accurately identified and approximated with precision, and physiological integrity or lack of integrity of the several muscles can be positively determined. In addition

accurate observations can be made upon the state of the nerves and muscles which not only permit of more complete and perfect repair, but also provide the basis for the determination of the degree of subsequent success of the operation. A simple, sterilizable bipolar electrode for the purpose can be made from two steel probes, encased in rubber tubing.

Cone, S. M. NERVE GROWTH. [Thompson-Yates Pathological Laboratory, University of Liverpool.]

Although the normal and most natural method of nerve growth after injury, which is commonly accepted, is by a sprouting from the central end, the author has been convinced that there is another method of nerve regeneration, sometimes called "autogenic." While in most instances nerves grow in direct continuity from a spinal connection, that does not always appear to be the case. In more than 450 specimens of war-injured nerves, the study of nerve regeneration has been simplified by the neurokeratin stain. The youngest, or "embryonal," nerve fibers are seen in their varicose shape and serpentine course in adhesions, intervening scar, central and peripheral ends of completely severed nerves, and become mature fibers on getting a spinal connection. The bulbs at the central end of a divided nerve may contain nerves of different ages and sizes, but the peripheral end generally contains new-formed nerves of uniform size. Nerves found in the distal (peripheral) ends of divided nerves are embryonal in most cases, and remain uniform in size and shape until connection is made with a centrally connected nerve trunk, when they mature. Injured nerve ends are either firm and gray with punctiform, translucent areas well seen in pressure, or are softer, succulent and pinkish gray, resembling cellular granulation tissue. The first is made up of masses of 1-6 μ sized young nerves in interlacing fasciculi, with a matrix of vascular cellular connective tissue. The latter consists of a protoplasmic mass of cells, and young 1-3 μ sized nerves tending to form fasciculi. When the report answered the latter description a few cases of early recovery (2-4 months) occurred. Where ends of the first type were recorded, very good results (4-8 months), were obtained. When the united ends show neither of these types as a predominant component, one may expect the usual functional results; *i.e.*, in one or two years. Clinical facts coupled with microscopic findings have convinced the author that early results are due to another method of nerve growth differing from the normal budding and downgrowth from the central end of the severed nerve. In cases where the limb is used two to four months after suture, the material described as homogeneous is invariably found to be gray or pinkish gray—usually succulent or gelatinous. The cases with well developed bundles of adult nerves took the normal time (8 months at least—usually longer) to recover function. What is most commonly seen in the proximal (central)

end, a few centimeters from the scar separating the cut ends, is a great proliferation of young varicose serpentine tendrils following vessels, or filling the old degenerated individual nerve fibers. Among these young nerve tendrils are innumerable elongated staff-shaped nuclei, and often there appears to be a transition of these end-to-end nuclei directly into nerve tendrils. On examining the nerves in a case where the arm was amputated sixteen months after complete severance of the ulnar and musculo spiral, long rows of staff-shaped nuclei were discovered, abutting end to end. The ulnar peripheral end was bulbed and separated by three inches from the central cut end. The bulb consisted of both adult and young nerve fibers, with no formation of connective tissue from the nuclei. In the author's opinion if a young embryonal nerve were invariably an ingrowth from surrounding nerves, one would more frequently see adult fibers among them. The young nerves are always surrounded by great numbers of elongated nuclei. These cells are neuroblasts. Guinea-pig implants have been found to contain a great amount of keratinized, serpentine and varicose fibers, which are not located in the center of the graft but $\frac{1}{2}$ to 2 inches away. This leads to the conviction that the Selmann sheath cells may wander into surrounding tissues, and there carry on neuroblastic functions. Moreover, one has been taught to expect preliminary degenerative changes in nerves before regeneration takes place. The independence of nerve growth is also proved by the finding of isolated nerve masses containing both young and adult nerves, degenerating and regenerating side by side in a matrix of cellular much nucleated material.

Corner, E. M. NERVES IN AMPUTATION STUMPS. [British Medical Journal, May 24, 1919.]

The author emphasizes the fact that nerves, as contrasted with other structures, have the peculiar power of regenerating, which in the case of amputation stumps leads to a wild growth of nerve fibrils throughout all of the structures. The immediate pain in an amputation stump is due to the injury of the nerves and passes away in a few days. The early pain is due to the growth of the nerves into the remaining structures, where if there is infection the nerve becomes subject to an infective neuritis. The practical points derived from these facts are to cut the nerves short at the amputation, to close the mouths of all divided nerves, and to take every possible means of avoiding infection of the wound. Remote pain is due to more complex causes, of which three factors are now known. (1) Infective inflammation and islands of fibrous tissue within the nerves. (2) The presence of foreign bodies within the nerves, such as silk and fibrous tissue. (3) The mental factor due to prolonged illness, hospital residence, lost job, and inability to take up new ways and interests. Therefore, silk should not be used in infective wounds; men should not be kept herded together longer than absolutely necessary; and the men should be got at work as soon as possible.

Dustin, E. FASCICULATION OF NERVE TRUNKS. [Ambulance de l'Océan, II, p. 135, Ed. Br. M. J., June 1, 1919.]

A knowledge of the disposition of nerve bundles in the trunks of the peripheral nerves has so obvious a value for suture and grafting that attempts have been made, chiefly by electrical stimulation, to trace the more important of them. Professor Dustin's recent contribution to the subject is of great importance. He made an anatomical study by means of sections and teased macerated specimens, of a considerable number of median, ulnar and musculo-spiral nerves, and showed that there are wide individual variations of fasciculation. Some trunks are but sparsely, some richly fasciculated, and the type is not characteristic of any particular nerve, though the ulnar is, of these three, the most broken up. In a given individual all three may be of one type but by no means necessarily, nor is there any essential bilateral symmetry. In a given trunk the type varies almost from millimeter to millimeter; that is, there is constant division and re-anastomosis of the fascicular plexus. Fusion occurs where there are no branches, diffusion near and at collateral or terminal branches. There are zones of dispersion and condensation. Close to the roots and in the plexus variability is very great, but still nodal zones are observable. It thus becomes evident that no functional systematization is possible on an anatomical basis, and that excitation-localization must be special to each individual nerve. Since the type of fasciculation alters constantly within a millimeter or two, and since a greater length than that must be removed for "freshening" before suture of a completely divided nerve, it is clear that exact anatomical apposition is impossible. The prognosis will be better the nearer the line of suture is to a nodal zone, that is, the more remote from a branch; the number of cross junctions will be minimal, and the amount of interposed cicatricial tissue proportionately less. In the case of partial section the case is very different. The neural contents of every sheath that is opened suffer demyelization with fibrillation and degeneration of axons, and consequently the greater the number of subdivisions of sheath, the fewer the axons likely to be destroyed by a given lateral wound. At or near a nodal zone half or a third of the axons are likely to be involved, and therefore at such a point a partial lesion justifies resection and total suture. On the other hand, a wound near branches offers good prospect of recovery from conservative repair, more especially in the biggest nerves. In the choice of a nerve for a graft there is no point in selecting an homologous nerve, but nodal portions should be taken to ensure a minimal amount of connective tissue interference.

Reinhardt, A. VARICES OF THE SCIATIC NERVE, SCIATICA, AND PHLEBOGENIC PAINS. [Müunch. med. Woch., 1918, No. 26.]

On the basis of a systematic study of the venous circulation and varicose swellings of the same in the course of the sciatic nerve Rein-

hardt makes the following general classes. (1) Varicosities within the nerve itself: (2) varices on the external parts of the nerve, which may run along the entire nerve, may be sacculated or vermiform, and may be one or both extending to the tibialis or peroneus beneath the knee; (3) combinations of both types. These varicosities are usually associated with or are caused by hypertrophy of connective tissue, either diffuse or circumscribed. In many instances an entire complex of varicosities, increased connective tissue and circumscribed fatty nodules combine to form pressure points upon the nerve giving rise to deep dull pains with the sensation of heaviness and deadness. True sciatic neuralgias may result from extensive chronic phases. Many cases may be cured by excision of the varicose complex. [J.]

Von Golt. EARLY STAGES OF POSTDIPHTHERITIC PARALYSIS. [Münch. med. Woch., 1918, No. 25.]

Those children who, after diphtheria, show Chvostek's sign and hyperreflex activity of the tendon reflexes are much more liable to develop paralyzes. Such testing is advisable in order to combat the possibility of paralysis, if possible, by minute attention to rest and proper protective measures.

Williamson, R. T. BRACHIAL NEURITIS. [B. M. J., June 7, 1919.]

An extremely valuable article on this widespread syndrome in which attention is drawn to pressure on the brachial plexus in the posterior triangle of the neck as one of the most frequent causes of the syndrome. Various kinds of pressure on the nerve roots such as from the shoulder straps, suspenders, falls, blows, carrying heavy weights, may cause this disturbance. These cases are best treated by a carefully adjusted sling which should pass over the shoulder of the normal arm, and under the elbow of the affected arm slightly raising it and elevating the shoulder and clavicle.

Belot, Tournay, and Dechambre. X-RAY TREATMENT OF NEURALGIC CONDITIONS. [Presse Méd., April 3, 1919.]

These authors report favorable results from X-ray treatment in severe cases of neuralgia. Cases relative to three different portions of the nerve pathways are referred to, viz., instances of superior radiculitis, of unilateral funiculitis, and of neuritis of the median nerve. Exposure to selected rays from a high intensity Coolidge tube caused sudden, complete, and permanent disappearance of pain in cases in which all other therapeutic procedures tried had failed.

Lesieur, Lhermitte et Jacquet. RABIES. [Bull. Soc. Med. Hop., 43, April 4, 1919, J. A. M. A.]

The girl of 14 whose case is described in detail by Lesieur, Lhermitte

and Jacquet had the bulbar form of rabies, with especially pronounced distress, actual anguish. The latter preceded by several days the organic manifestations. They regard this sensation of anguish as a characteristic bulbar phenomenon. In some of the paroxysms of anguish it seemed to comprise the whole disease, as if it were to rabies what the muscular spasm is to tetanus. In this case the rabies developed nearly three months after the child had been bitten. She had been given systematic antirabies treatment, commencing fifty-three hours after the bite of the rabid dog. Netter reported a similar case in which the agitation, distress and periods of delirium had preceded by eleven days all the other symptoms of rabies. The boy of 11 had been bitten in the cheek two months before by a small dog with which he was playing and which later disappeared.

Lenormant, J. TETANUS AND ANTITETANIC INJECTIONS. [Paris Letter, J. A. M. A., Aug. 2, 1919.]

At one of the recent meetings of the Paris Surgical Society, Dr. Lenormant, hospital surgeon and agrégé professor of the Paris School of Medicine, contributed an interesting communication on the subject of tetanus and antitetanic injections. The war, in this case, as in so many other matters, furnished a wide field for the gaining of experience, and it is important to consider carefully the question of antitetanic serotherapy of which Lenormant is an earnest advocate. First, one must consider the limits of its use both as to time and as to quantity. It is without doubt a matter of paramount necessity to suppress the further elaboration of toxins by the removal of foreign bodies, but it is wrong to assume that such removal brings about the sterilization of the wounds. It is therefore indispensable that the serum be continued in doses sufficiently large (20 c.c.) and that the treatment be kept up as long as the wounds are suppurating. Lenormant saw cases of tetanus at the beginning of the war, in September, 1914, at Montdidier; then again in 1916, while he was chief surgeon of the sector in the Fifth Region and received directly from the front the moderately wounded. He observed under these conditions thirty cases of tetanus, almost all of them being late cases which developed from five to eight weeks or more after the wounding. A comparison of these two series of cases is very striking. In 1914 the cases were generalized and were all fatal. In 1916 the tetanus was almost always localized at the outset (painful spasmodic contractures in the wounded member), rarely complicated by trismus, but if so, resulting in quick death. The mortality was only 50 per cent., as compared with 100 per cent. in 1914. The wounded men of the second series had received repeated injections of antitetanic serum. Tetanus immediately became less frequent and less severe in its manifestations and often remained localized. Under these circumstances how can one deny the value of the serum? However, Lenormant reported having

seen two soldiers who, in spite of repeated injections of antitetanic serum, presented, one month after being wounded, a typical tetanus with opisthotonos and generalized spasmodic contractures, but even these cases ended with recovery. The serum seems, therefore, to have been incapable of preventing the appearance of the tetanus, although it did lessen its gravity. In delayed operations the practice of injecting antitetanic serum as a preventive seems to be an excellent use, for one must not attach too great importance to anaphylactic accidents, and it is better to give a patient an injection unnecessarily than to have a case of tetanus break out.

Raymond. TETANUS. [Lancet, Oct. 19, 1918.]

Two patients with tetanus are reported upon in which the tetanus followed a very superficial wound, so superficial that the wounded man did not present himself for treatment, and consequently did not receive preventive injection of antitetanic serum. The treatment was based on: (1) Excision of the wound. This was carried out as in the case of a malignant tumor, by circumscribing very widely the whole region of the wound. The object was to remove the tetanigenic germs with the tissues which contained them, without causing the penetration, by way of the operation wound, of tetanic toxin into the circulation. (2) The excision of the wound having suppressed all new access of tetanic toxin, it only remained to combat the toxin already fixed in the tissues.

Serotherapy in high doses gave excellent results. The doses employed were 100 c.c. of serum each day by the subcutaneous route. The injections were continued until the injection was overcome, that is to say, from ten to fifteen days. Tetanus in trench foot is always grave, and almost all the cases have been fatal. If systematic amputation of the feet is avoided, as Raymond says it should be, it is of importance to comply with the following rules: (1) To make in all cases a prophylactic injection, as early as possible, of 20 c.c. of antitetanic serum. (2) To repeat this injection, in all the cases where there has been loss of substance of the integuments, phlyctenæ or eschar, at the end of eight days. (3) Not to fear, in the grave forms with extensive gangrene, infective manifestations, to increase the doses and inject 30 c.c. and more. (4) To make an injection of 10 c.c., at the least, every eight days as long as there exist sphacelated tissues, necrosed or suppurating zones—in short, as long as the wound is not in the way of definite cicatrization. (5) Not to allow an interval of more than eight days between each injection of antitetanic serum, alike to assure the continuity of the anti-toxic treatment and to avoid seric or anaphylactic accidents. Thanks to this practice Raymond has had only the two cases of tetanus among several hundred serious cases treated.

2. CRANIAL NERVES.

Fuchs, E. UNSTRIPED MUSCLE FIBERS IN INTERNAL OCULAR MUSCLES.
[Arch. f. Ophth., 95, 1918, 311.]

The existence of muscular fibers other than those leading to the ciliary muscle has been disputed. The author by means of frontal sections finds them to be present especially in the neighborhood of the papillæ due to attachments of the ocular tendons. They are plain and branched, and a figure of them is given. Whether they help in the maintenance of intra-ocular pressure is discussed. (Phys. Abst.)

Allee, W. C., and Stein, E. R. LIGHT REACTIONS IN MAY-FLY NYMPHS.
[Jl. Exp. Zoöl., 26, 1918, No. 3, Phys. Abst.]

The light reaction of the May-fly nymph, *Epeorus*, was reversed by treatment with alcohol, lowered temperature, calcium chloride, and other reagents. Nymphs so reversed had a lower rate of metabolism as measured by resistance to potassium cyanide than normal nymphs. The negative nymph, *Leptophlebia*, was similarly reversed. A negative nymph belonging to the *Heptageniæ* was reversed in its light reactions with accompanying increase or decrease in carbon dioxide production as measured by Tashiro's biometer. The experiments demonstrate that the phototactic reaction is correlated with the metabolic condition, and indicate that changes in metabolism are causal. All nymphs that reversed their light reactions were either stimulated or depressed, but stimulation or depression did not necessarily involve phototactic reversal.

Gordon, Alfred. UNILATERAL PARALYSIS OF THE THIRD NERVE WITH HOMOLATERAL MOTOR AND SENSORY SYMPTOMS. [Phil. Neurological Soc., 1919.]

R. F., girl of 22, was injured by being run over by an automobile. When carried in an unconscious state to a nearby hospital, she was found to have a fracture of the skull. An operation was performed.

When seen by the writer several weeks later she presented besides mental phenomena (confusion, inability of recognizing her own people, extreme restlessness) the following symptoms.

There was a semicircular scar on the right side of the skull extending from the frontal region down back of the ear. Above the temporal region there is a large depression due to removal of a bony portion. The right third nerve was completely involved: superior, inferior and internal recti muscles—all paralyzed; the pupil enlarged and immobile, does not react to light; the upper eyelid in a state of complete ptosis, so that the eye was totally closed. She had difficulty of walking. Ataxia was observed in the right leg; she walked towards the right and her raising and lowering the right leg were very awkward. When in dorsal position the ataxia of the right leg was also marked, as in raising it the

leg would sway from side to side. When asked to touch with the right leg certain portions of the left ataxia was also observed. No paralysis was present. The right knee-jerk was greatly exaggerated. Ankle-clonus was present, but the toe-phenomenon by any of the methods was absent.

The sensations of the right leg were somewhat diminished. The right arm presented also ataxia, dysmetria and intention tremor. Sensations were but slightly diminished, astereognosis was absent.

The patient gradually improved. The mental condition has entirely disappeared. The ocular symptoms have greatly improved with the exception of the pupil which still does not react to light and is dilated.

The slight sensory disturbances of the right arm and leg have totally disappeared. Her gait is still somewhat ataxic in the right leg. The reflexes are the same. The dysmetria, ataxia and intention tremor of the right arm are still present although milder in intensity. Patient states, that frequently objects drop out of her hand and she spills liquids. Besides, her right arm and leg are always animated with jerky movements and sometimes with athetoid movements.

In every other respect the patient is normal. Wassermann test of blood and spinal fluid is negative. There are no changes in the eye-grounds. The mentality is normal.

Comment.—The absence of sensory-motor disturbances on the left side, the presence of cerebellar syndrome elements on the right, viz., ataxia, dysmetria, intention tremor; the absence of paralysis; the involvement of the third nerve,—all these conditions are in favor of a lesion in the right superior cerebellar peduncle below its decussation. There was probably a hemorrhage simultaneously occurring with the fracture of the skull.

The patient has made considerable progress under large doses of iodides with the exception of the pupil which remains dilated and immobile. The cerebellar symptoms have all improved. [Author's Abstract.]

Bourguet, J. GASSERIAN OPERATION FOR TIC DOULOUREUX. [Bull. Acad. de Méd., 81, May 13, 1919.]

This author after having remissions after all forms of alcoholic injections advises gasserectomy through a curved incision in the temporal bone. This exposes the maxillary nerves and leads directly to the ganglion. He detaches the dura and severs the middle meningeal. He then cuts the fibrous connections between the ganglion and the dura. Keratitis develops afterwards, but yields to treatment.

Roumaillac, E. NEURALGIA OF TRIGEMINUS. [Jour. Méd. de Bordeaux, 90, June 25, 1919.]

This patient, a woman 34 years of age, had had very severe trigeminal

neuralgia for five years. An injection of 1.5 c.c. of turpentine, made in the left thigh caused a diffuse phlegmon, but the neuralgia stopped. This is a plainly psychogenetic tic douloureux cured by the process of substitution through a physical fixation although the author would explain the cure by stopping autointoxication by turpentine.

Lemon, A. E. SEASICKNESS. [J. A. M. A., July 12, 1919.]

Lemon reports his observations of seasickness on the transport *Great Northern* on a passage with troops from Brest to New York. His previous sea experience had included some Newfoundland trips, which were free from this disorder. But the *Great Northern* had a marked plunging motion, or rise and fall, owing to the light forward ballast and the high speed. There was very little rolling motion. While he had never been seasick before for years, and was not sick at all on the rough trip across in February, 1918, he became very sick as soon as they got out of the Brest harbor. He had been careful to prepare himself for the trip, eliminating diet indiscretions, alcohol and constipation as possible causes. He felt a fine, indefinite change of pressure on the ear drums, for which he could find no cause, and to relieve it packed his ears, without touching the drum, with sterile gauze which gave immediate relief. As 90 per cent. of the troops on board and a considerable number of the crew were seasick, totaling at least 700 individuals, he applied the same remedy as official surgeon of the troops, to those who were still affected. After being relieved for several hours, removal of the packing brought on the symptoms again in some cases. He learned also that soldiers that had been under shell fire were much more liable to seasickness, and surgeons from other transports have told him that almost without exception such men were more affected with seasickness coming back than when going over. His success on this trip with the method used was so immediate and effective that the only possible cause of its failure on other ships would seem to be the unlikely but possible existence of other forms of seasickness.

Bard, L. CENTERS FOR THERMIC NYSTAGMUS. [Arch. de phys. et d. path. gén., 17, 1918, 788.]

According to Bard's experiments with the Barany tests the nystagmus due to irrigation to the external auditory canal with warm or cold water has a double origin. Conjugate deviation he maintains is of cerebral origin. Ataxia is of cerebellar origin.

de Kleyn, H., and Tumbelaka, R. VESTIBULAR EYE REFLEXES. [Archiv f. Ophth., 95, 1918, 314.]

The individual ocular nerves were cut in rabbits on one side, and the nystagmus reflex was found to be bilateral. In the present study two patients with complete unilateral oculo-motor paralyses are described in which the reflex occurred on both sides.

Quix, F. H. OTOLITHS. [Med. Tijdsch. v. Geneesk., 1, 1919, March 22, 1919, J. A. M. A.]

Quix presents evidence to sustain his assertions that geometrical and mathematical analysis of the pressure exerted and experienced by the otoliths opens up a new field for research on the sense of equilibration. The disturbances in man and animals after removal of one or both labyrinths are also instructive in this line. With congenital caput obstipum the head is held in exactly the same way as a rabbit holds its head after removal of the labyrinth on one side. If this finding should be confirmed in other cases, it would suggest as the cause of caput obstipum that the muscular contraction is a reflex phenomenon from the otolith sacculus of the otherwise normal sense of equilibration.

Bergh. DATA ABOUT THE DEAFMUTE. [Svenske Läkare. Handl., Dec. 31, 1918, Med. Rec.]

Interesting data about the deafmute are to be found in reference volumes, but the discrepancies are often notable and the absence of proper controls is at times significant. Institutional life for example may be responsible for some peculiarities ascribed to the disability. This study is devoted to an exhaustive review of deafmutism from the pen of Bergh. One Swedish province alone is concerned—Malmöhus, and the entire material, urban and rural, is analyzed, the total amounting to 383. There are about 8 deaf-mutes for each 10,000 inhabitants. Males outnumber females and as the proportion of female to male inhabitants is 106 to 100 this cannot be accidental. In regard to origin about 28 per cent. of cases were congenital and 63 per cent. acquired, while in 9 per cent. the origin could not be determined. Certain alleged uneugenic factors such as illegitimacy and discrepancy in parents' ages could be excluded as causes. Direct and indirect inheritance was of minor importance and abuse of alcohol in ascendants could be almost if not quite eliminated as a factor. Consanguineous marriages, like inheritance, played a small but assured rôle. In general, attempts to connect well-known factors in the production of disease and malformation with deafmutism seem to have broken down. On the other hand certain data seemed quite meaningless, as a notable tendency to involve the left ear. The author analyzes his material from almost every possible angle, but in the end we arrive only at the conclusion that the deafmute is a defective *sui generis* and also a chance victim of infections in which there may of course be a predisposition. The number would diminish if we could banish smallpox, typhoid fever, cerebrospinal meningitis, and other infections and be authorized to treat promptly and continually all middle-ear disease in the young child.

3. SPINAL CORD.

Dewey, K. W. PATHWAYS OF THE CEREBROSPINAL FLUID AND THE CHOROID PLEXUS. [Anat. Rec., August, 15, 1918, No. 1, Phys. Abst.]

The results of subarachnoid injections of trypan-blue in rabbits seem to support the view that the failure of specific connective tissue cells within the brain and spinal cord to take the vital stain after intravenous injections, is due to a lack of affinity for the stain rather than the alleged protection by the choroid plexus. The conditions under which vitally stained cells of this type occur after subarachnoid injections—only in some cases, never throughout; always restricted to small regions, more extensively in the vicinity of encephalitic foci—indicate that they react to the stain only under the influence of pathological stimuli. The vitally staining “Körnchenzellen” in cerebral and spinal lesions are unquestionably derived from perivascular endothelial cells. The presence of these cells demonstrable by vital staining under the above conditions may be assumed to denote the existence of endothelial clad perivascular channels for the cerebrospinal fluid. The constancy of occurrence of vitally staining connective tissue cells in other parts of the body suggest the possibility that throughout these cells are intimately related to the lymph system. The direction of the current of the cerebrospinal fluid is indicated by the more or less sudden changes in the intensity of the staining reaction on the part of such cells in the membranes; they occur at the places of communication between the channels of the cerebrospinal fluid and true lymph.

Genoese, G. CEREBROSPINAL FLUID IN MALARIA. [Policlinico, 26, June 15, 1919.]

The findings in ten cases of malaria in children are here reported upon. During the attacks there are evidences of the meningeal reaction. Increased albumin, more or less intense lymphytosis, and some increase in the chloride content.

Pedrazzini, F. CEREBROSPINAL FLUID CIRCULATION. [L'Ospedale Maggiore, Nos, 11, 12, Phys. Abst.]

The author discusses many questions concerning the physics of cerebrospinal circulation in relation to anatomical structure. Apart from a discussion of his own earlier work and that of others, the principal new experiments are: (1) Removal of the brain tissue from cadavers by a jet of water under pressure, replacement by a gelatin solution, and after this had set, transverse section by a circular saw. He concludes that some sinuses—*c.g.*, longitudinal, superior, and lateral—are not deformed by pressure, others (the cavernous and petrous inferior sinuses and anterior portion of sinus rectus) are so deformed. (2) The cerebral pulse can only be compared to that of other organs when the cranium

is opened, or partially replaced by an elastic membrane (one clinical experiment) ; when closed the elastic sac of the meninges sets up, through the cerebrospinal fluid, an equal and opposite reaction. (3) The arachnoid space, full of liquid, remains in a state of elastic tension. On puncture a small quantity of fluid escapes, and the pressure becomes simply hydrostatic, the pulsation of bloodvessels is no longer registered in the apparatus, and there is merely a rise and fall of liquid. The author gives a diagrammatic representation of the cerebrospinal circulation, and a bibliography of the subject in which 28 papers are discussed at some length.

Deluca, H. R. CEREbroSPINAL FLUID IN INFLUENZA. [N. Y. M. J., 40, July 19, 1919.]

A report upon the findings in 25 cases of influenza. In all there was an increase in the pressure. The fluid was never turbid or cloudy. The Noguchi reaction was strongly positive. The reduction of Fehling's solution was present. The cell count was rarely increased. In one case only was it forty to the cubic millimeter. A predominance of polymorphonuclear cells over the lymphocytes, although disintegration of these cells was marked. Spinal fluid cultures revealed the presence of a characteristic organism different from any heretofore isolated from the spinal fluid.

Hoffmann, P. KNEE-JERKS AND TONUS. [Zeit. f. Biologie, 68, 1918, 351, Phys. Abst.]

A method is described for the investigation of the tendon reflex in normal persons under various conditions. The tendon reflex is elicited by a series of induction shocks—varying from 8 to 120 per second—to the nerve supplying the muscle; under such conditions two action currents in the muscle may be demonstrated by the Einthoven string galvanometer—(1) due to the direct nerve impulse and (2) to the reflex action. In experiments carried out mainly on himself it was found that the reflex could be elicited from the extensors of the foot in the relaxed position, but an extraordinary increase in the strength of the reflex was produced by standing on the toes—*i.e.*, by voluntary contraction of the muscles; contraction of the antagonists on the other hand—with resulting complete relaxation of the extensors—prevented the occurrence of the reflex. The reflex could only be elicited from the peronei the extensors of the knee and the muscles of the lower and upper arm when there was concomitant voluntary contraction. The number of reflexes elicited per second varied from 25 in the relaxed to 150 in the contracted muscle, indicating a conduction of the reflex in the spinal cord at least as rapid as the normal output of impulses causing voluntary contraction. The importance of tendon reflexes in the maintenance of the position of the limb was shown by the fact that the action current in the biceps

in response to a heavy blow on the hand occurred in 0.015 second—*i.e.*, the latent period of the tendon reflex. The relation of this result to the question of tonus is indicated.

Lurie, L. A. PERNICIOUS ANEMIA. [Arch. Neur. and Psych., 2, July, 1919, J. A. M. A.]

In speaking of the neuropathology of pernicious anemia, Lurie says it is not sufficient merely to describe the lesions found in the spinal cord. The brain changes are too numerous and definite to be omitted. The neuropathology of pernicious anemia should include the entire central nervous system. He records the findings in four cases.

Crafts, L. M. GREAT TOE SIGN. [J. A. M. A., July 26, 1919.]

Crafts, while studying a remarkable grouping of various reflex responses in a case of back injury, had his attention attracted, among other interesting phenomena, to a sharp dorsal extension of the great toe, occurring when an upward stroke was made with a blunt point over the anterior surface of the ankle. Trying this test in other cases convinced him that another method of eliciting the pathologic toe sign had been discovered. The patient had been injured by a heavy body falling on his shoulders when lifting, doubling him over sharply and causing numbness immediately on the mid line of the body, but not at once disabling him. The other symptoms of paralysis came on some months later, and a laminectomy was performed. A mass, found to be a hypernephroma, was removed. Improvement followed, so that the patient was enabled to get from his bed to a wheel-chair and back. The various methods of eliciting the great toe reflex hitherto described, by Babinski, Oppenheim, Gordon, and Shattuck, are mentioned. They are all of identical significance, indicating definite involvement of the motor neuron. Two other cases in which the great toe sign was present are reported. During the past two years, in his practice, the occurrence of this pathologic sign had been demonstrated in a fairly wide range of conditions, including ". . . multiple sclerosis (frequently), spinal cord tumor, brain trauma, cerebral apoplexy, brain tumor (both cerebral and cerebellar), brain abscess, symptomatic epilepsy, syphilitic myelitis complicating tabes, spinal cord trauma and acute bulbar paralysis." It is therefore, Hall thinks, comparable to the Babinski test, secondary to it in the constancy of occurrence, and of the same significance and importance.

Gordon, Alfred. RECRUDESCENCE OF MYELITIC DISTURBANCES AFTER MANY MONTHS OF RECOVERY FROM ACUTE ANTERIOR POLIOMYELITIS. [Philadelphia Neurological Society, 1919.]

That the acute symptoms of anterior poliomyelitis after a long interval of a few or many years may repeat themselves in the portions of the body previously affected is well known, but that acute poliomyelitis may

be followed by other diseases of the cord is not altogether frequent, since cases on record are comparatively few. Dutil, Ballet, Langer, Laeher, Charcot, Hirsh recorded a few cases in which spinal diseases made their appearance many years after the initial symptoms of anterior poliomyelitis. They prove that the presence of an old myelitic focus, though healed up, is not an indifferent factor for the future of the patient so far as his spinal cord is concerned. Such locus minoris resistantiæ can be a point of departure for new inflammatory processes either in the old injured place or in the immediate vicinity, or at a distance in the same cord. A concussion, circulatory disturbances, infectious diseases, exposure, trauma—are all factors for awakening an old extinguished focus. In 1902 the author presented before the Philadelphia Neurological Society (December 23) a patient with amyotrophic lateral sclerosis following eight years after an attack of acute anterior poliomyelitis. The disease developed à propos of an accident with a fracture of one limb. Hirsh (*JOUR. OF NERV. AND MENT. DIS.*, 1899) reported a similar case with autopsy. The patient presented to-night is a girl of 18. In August, 1917, she had a typical attack of acute anterior poliomyelitis in which all four extremities were at first involved. She was confined to bed for four months, after which she gradually made a complete recovery. Seven months later she noticed a gradually on-coming weakness in the lower extremities accompanied by sharp shooting pains in the same limbs. Upon examination one finds at present ataxia; paresis of the lower limbs (more in the right than in the left limb); foot-drop on the right; Romberg's sign; absence of rigidity loss of knee-jerks. The pain is of a radicular type and objectively one observes an analgesia over the antero-internal surface of the right leg. The pain is continuous with occasional exacerbations of a lancinating character. The sphincters are intact. The diagnosis based on the present condition is between tabes, multiple neuritis and meningo-myelitis. The history of the case, the absence of eye symptoms, negative Wassermann, absence of typical symptoms of multiple neuritis, except the pain, makes the author consider meningo-myelitis as the possible diagnosis. [Author's Abstract.]

Book Reviews

White, William A. THOUGHTS OF A PSYCHIATRIST ON THE WAR AND AFTER. Paul B. Hoeber, New York, 1919. \$1.75.

What is the meaning of the present apparently chaotic state of affairs in the world and whither through it are we tending? These familiar questions are on every lip. This little book attempts to show something comprehensive, certain principles of biology and of psychology, two inseparable sciences of human life, which underlie these questions and contain their answer in the widest significance. Not that such a small volume, nor even a far larger one could presume to state any decisive clearcut answer which would satisfy the present spirit of inquiry and of effort to arrive at some practical solution.

The author has done something better than that. He has pointed out the lines which are followed by the present unrest and the conflict and anxiety accompanying this. These lines he shows us are older than humanity itself, the working of slow moving basic principles out of which all temporary and changing conditions grow. There is therefore through such a study, brief as it is, some hope of understanding the forces and the mechanisms of those forces, and the various events and conditions arising out of these with which society and its members have to deal. The book therefore tends toward a more patient attitude with a greater assurance of some end other than that of complete and final chaos and overthrow. This is not a passive patience for the searching philosophy of the author, based upon his own intensive psychological and psychiatric experience, points plainly and definitely to paths of active and intelligent participation in the real progress of events and the evolution of a broader, more stable condition of society.

White gives us first a perspective of the relation of the individual and society in the history of human development with its analogy in organic cell life, which he uses to show the fundamental inevitableness of just such conflicts as the world has been through in the War and is still passing through. Individual instincts for individual self preservation and production struggle over against the same needs from the herd or group standpoint. Such a conflict must always accompany life and mark its progress, for both individual and group are necessarily always interdependent and there must be adjustment toward each by the other even with some sacrifice.

This necessitates repression on the part of the individual of active tendencies, which then may form themselves into socially useful forms of

energy discharge or they may return in a projected feeling toward other members of the group, as in the forms of condemnation and destructiveness which fail to better conditions. Progress is won rather by a constructive attitude which recognizes side by side the two forms in which living tendencies manifest themselves, for individual interest or for that of the larger and increasingly larger group. This principle the author applies to the questions not only of the existence of the war, its ambivalent effect upon civilization and the attitude to be assumed toward our one time enemies. He applies it also to the conditions of unrest and change manifest everywhere since the war and definitely also to the question whether the time is not ripe for a larger group combination and activity to be worked out in a league of nations.

The book lacks some of the keener originality and maturer perfection of thought which usually characterize the writer's works, but this is compensated by the timeliness and aptness of these "Thoughts" thrown off as they have been in the face of practical situations. To these he gives that broader basis and that interpretative setting which gives so true a philosophical as well as practical value.

Lessing, Oscar. DIE HYSTERIE ODER SOGENANNT E PSYCHOGENE NEUROSE.

Eine psychopathologische Studie auf dem Grenzgebiete des Nerven- und Seelenlebens. Published by S. Karger, Berlin, 1920.

This little book is of the sort to stand in the gap between a strictly medical treatise appealing only to the trained physician and the laity, to whom after all the subject of disease pertains most closely. It is only a brief discussion of hysteria in actual length but it presents so complete a summary and in such an appreciative and sympathetic manner that it possesses real value for any reader.

The writer views hysteria as a group of symptomatic manifestations arising out of a certain psychic background and depending for their form and appearance as symptoms upon certain describable mental mechanisms. In reviewing these he acknowledges his debt to Freud and utilizes freely the concept of the existence and activity of a large part of the mental life in the unconscious. Only thus are explained the factors of repression, conflict and the return of repressed material to form the hysterical symptoms. He describes these various symptoms and discusses their formation, as arising out of the utilization of the somatic pathways according to false conceptions of the body and its functions which may exist in the unconscious, the following out of personal wishes hidden there, the protest against the circumstances of the environment. He states that there is no impairment of the intellect in the hysteric, only a restricted use of its critical sense to serve the personal ends. There is a brief review of the history of hysteria and also a reference to the added importance of hysteria as a subject of interest among the mental disturbances in military and civil population arising because of

the war. He refers also to its very practical bearing upon such questions as accident insurance and the like and the working here through the unconscious of the typical hysterical reactions.

The interest in the book does not lie in its presentation of new material. Such is hardly the scope of so small a work. But it presents these very important truths concerning this prevalent order of disturbance in a very well digested and enlightening manner. Its illustrations of the working of the unconscious life are particularly happy ones and its acceptance of the unconscious activity which produces hysteria as well as of the analytical method of reaching these is peculiarly simple, straightforward and convincing. The writer still separates other operative causes from the sexual, simply because he does not extend the term sexual to include all impulse as Freud does. It is not evidently because he has any difficulty in accepting a sexual etiology or the operation of such even in childhood.

He states his only regret concerning psychoanalysis, that it is not a method which practically can be applied to a sufficient number of cases of such a universal disorder. Still his own broad and receptively sympathetic comprehension of the whole hysterical problem testifies to the value of such an analytic attitude. He looks hopefully forward to a time when more of the unconscious will be available for well directed rather than hysterical activity and to a more natural mode of existence which may make hysteria a thing unknown in some future generation. He would approach the problems of hysteria with an "unprejudiced, penetrating, scientific research" into the "shy, closed-in soul of the hysteric." Such an attitude may well be spread abroad throughout the medical profession and the public at large, in order to bring such a future condition to pass.

van Schelven, Th. TRAUMA UND NERVENSYSTEM. MIT GLEICHMÄSSIGER BERÜCKSICHTIGUNG DER KRIEGSERFAHRUNGEN DER ENTENTELÄNDER UND DER MITTELMÄCHTE. S. Karger, Berlin, 1920.

Dr. van Schelven, a nerve specialist of Hague, was neurologist to the Netherlands Sanitary Commission and as a neutral had exceptional opportunities for practical work and observation in many of the countries at war. Furthermore he evidently had access to the literature of both contestants as an exceptionally rich series of citations testifies.

Notwithstanding the numberless new examples of human vivisections due to the war and the new points of view started, there was lacking that many-sided application to a unified understanding that in pre-war times was so valuable in working out the fundamental problems of the effects of trauma upon the nervous system. The author has however been the first to bring to pass that work of correlation of the different and differing groups of observers and in the reviewer's opinion has given the best general account of the war injuries to the nervous system thus far pub-

lished. Its value is greatly augmented since the writer, as a neurologist of experience, has been able to personally follow up the work of many of the observers quoted and check up the findings from his own experience. He divides his book into the study of Peripheral Nerve Lesions, Spinal Cord, Brain and the Neuroses. His book is 300 pages. Under the peripheral nerves he discusses the pathogenesis, pathology, clinical findings, diagnosis and therapy. A somewhat similar scheme is followed for the spinal cord and brain injuries.

So much has been written upon the various traumatic pictures it is useless to further particularize the careful and detailed discussions given in these pages. We can lay special stress upon his thorough analysis of Babinski's contributions to the subject of physiopathic or reflex disorders. It is exceptionally succinct, useful and thorough.

A suggestive series of paragraphs take up the caisson types of disturbance in the spinal cord seen following exposure to great air pressures from explosives. His discussion of the traumatic neuroses is sound and understanding.

Whereas the whole work is of necessity but a rapid summary, it is a highly creditable one.

JELLIFFE.

Stewart, J. Purves, and Evans, Arthur. NERVE INJURIES AND THEIR TREATMENT. Second Edition. Oxford University Press. New York.

For many years to come the after results of nerve injuries which have been occasioned in the Great War will undoubtedly come for revision to the neurologists of this and later generations. This compact but very complete work will serve a very useful purpose in this study of peripheral nerve wounds.

Originally written while in the middle of the war, its present careful revision has come at its close and we here repeat what was said of the first edition. It is a carefully and thoroughly prepared work, of a nature neither too elementary for experts, nor too technical for the general practitioner. It is very well illustrated and is worthy a place by the side of the more ambitious works of Tinel, Athanassio-Benisty and other works of continental writers.

Wimmer, A., and Hoisholt, A. W. PSYCHIATRIC-NEUROLOGIC EXAMINATION METHODS. C. V. Mosby, St. Louis, Mo.

This is a translation of a small work by Wimmer, of Copenhagen, by Dr. Hoisholt, professor of psychiatry at Leland Stanford University, and is a useful, short and convenient precis of case examination methods for the psychoses, psychoneuroses, and in part for sensorimotor disturbances.

While the chief features are obtainable in larger works this has the merit of great convenience and compact arrangement.

Dunton, W. Rush. RECONSTRUCTION THERAPY. W. B. Saunders Company, Philadelphia, 1919.

Reconstruction is the order of the day. There is great danger lest its needs be really lost in the great gusto with which it is being talked about. Like the many, many things that the newspapers say are going to happen, and never do happen, so reconstruction is threatened with much enthusiasm and little sense.

This little work, however, gets right down to business and in an incredibly short space the author has presented a program of work to be accomplished and suggestions looking towards its being done that are eminently sound and sensible.

Dana, C. L. STUDIES FROM THE DEPARTMENT OF NEUROLOGY. Cornell University Medical Bulletin, Vol. IX, No. 2, October, 1919.

This collection of Studies, 19 in number, makes an excellent showing for a period during which so many activities were still hampered by the upsettings of the war clouds.

Dr. Dana himself has contributed six of the papers, two in conjunction with others, Dr. Kennedy has three, Dr. Frink two, Dr. Oberndorf seven, and Dr. Karpas, one.

In Dr. Dana's first paper on "Morbid Somnolence and the Endocrine Glands" we find the following comment: "Sleep is a biological phenomena which needs to be explained only as the waking state, or the diastole or the systole of the heart need to be explained. It is not forced upon the system by any special hypnotizing secretion. It is a part of the inherent and rhythmic action of living tissue." Through how many scores of volumes has the reviewer been bored to death with discussing this so-called "toxic substance" which has been assumed to cause sleep? We are glad to see Dr. Dana sum it up so neatly and soundly, as an ambivalent mechanism of living matter.

One would like to review the various papers but they have all been mentioned in our current literature department with the exception of the valuable psychanalytic papers, by Frink, Oberndorf, and Karpas. It may, in parenthesis, be noted that more than one half of the volume is devoted to psychoanalysis. It is to be regretted that so many of the general neurological clinics have been so tardy in their recognition of the psychoanalytic movement.

JELLIFFE.

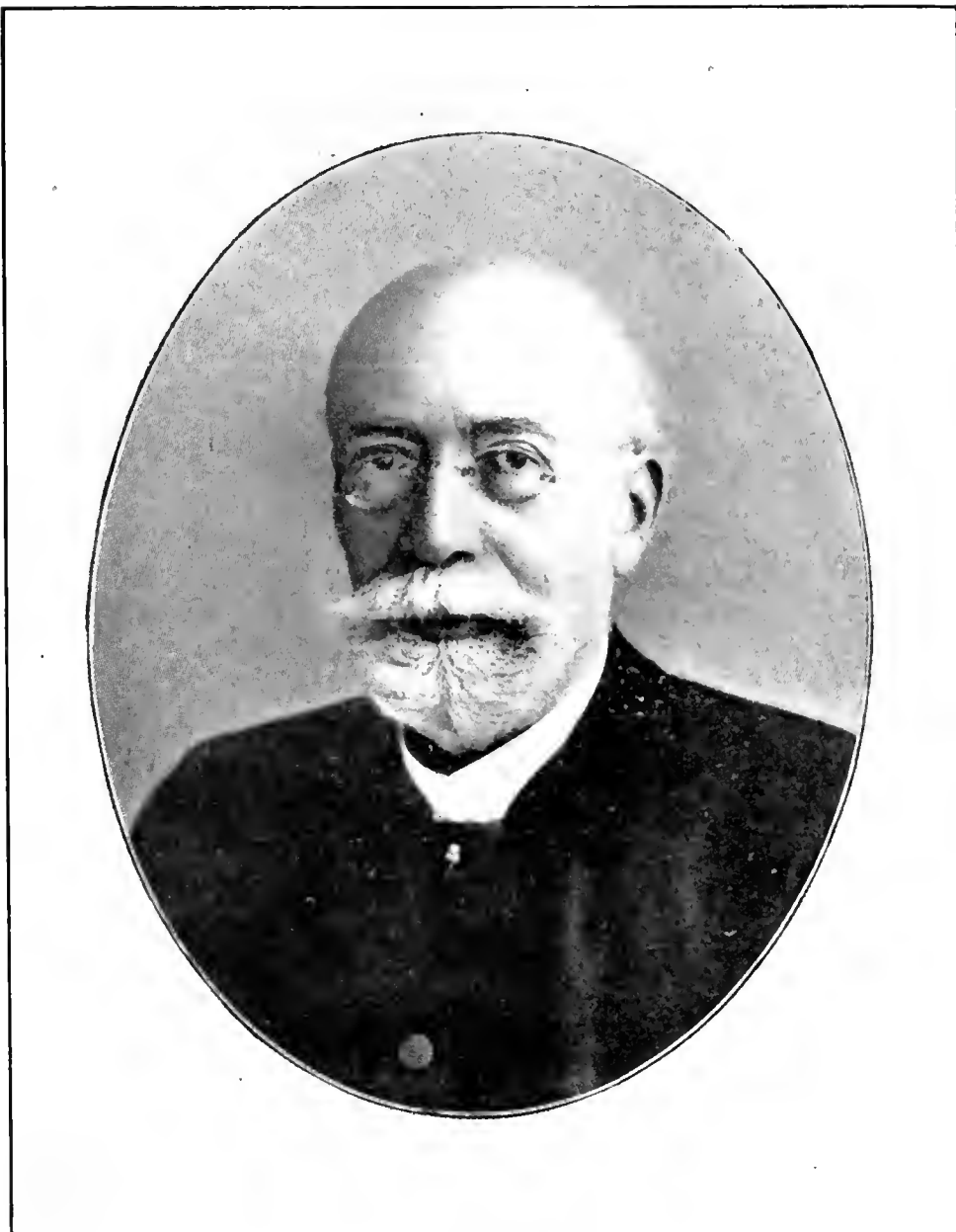
Bailey, P., et al. CONTRIBUTIONS FROM THE THIRD DIVISION NEUROLOGICAL INSTITUTE OF NEW YORK. Vol. III, 1919.

Dr. Bailey's service at the Neurological Institute is filled with a suggestive and original series of studies, which, although they have appeared in other magazines, make an attractive grouping and reflect the work of those in the clinic to their credit. Drs. Morris Karpas and

Edward Rochefort died in the Service, and the volume opens appropriately with obituaries accompanied by excellent photographs of these young and promising neurologists. Twenty papers are then grouped, having been written by Drs. Bailey, Timme, Hunt, Pardee, Grimberg, Karpas, Elsberg, Rochefort and Meagher, of the III Neurological Service at the institute.

Bailey's paper on the "Care and Disposition of the Military Insane" gives a complete summary of the activities of the A. E. F. Neuropsychiatric Service, both here and in Europe, which, supplemented by a personal inspection of the work in Europe, serves to make this a foundation stone for the development of future Neuropsychiatric effort in connection with military affairs. Timme has given a very original description of a new pluriglandular syndrome, laying down some useful principles for those interested in this obscure and involved region of speculative effort. Hunt's studies are particularly noteworthy, attempting as they do to enter into and to throw light upon the complicated anatomy and physiology of the extrapyramidal motor components, especially in relation to the globus pallidus and the corpora striata. Karpas has an interesting contribution to the psychopathology of prostitution.

JELLIFFE.



AUGUSTO TAMBURINI

Obituaries

AUGUSTO TAMBURINI

An unusual combination of gracious personal qualities and a wide exercise of these in many directions in his profession distinguished this neurologist and psychiatrist whose death occurred in July, 1919. Augusto Tamburini was born in 1848 in Ancona, Italy, and though of modest origin early displayed that scientific interest in his studies and that spirit of energy and progress combined with his native characteristic charm which made him a distinctive figure in Italian neurology and psychiatry. His medical studies were pursued in Bologna under Magni and other masters who were gathered there. He received his degree in 1871 and at once began his service in his native city where he was made assistant in the general civil hospital. Here he first discovered the special interest which psychiatry was to have for him.

His spirit of progress and initiative was soon aroused by a request from Ignazio Zani to become his assistant in the work he had undertaken, the reform of the asylum of Reggio Emilia. He acquired with him a valuable experience in the hospital technic with which this master worked out his bold innovations and when Zani suddenly died, after a short period of service, Tamburini was able to take his share in the direction of the hospital for several months. It was then that Professor Carlo Livi, of Sienna, came to Reggio and Tamburini became his assistant in the chair of psychiatry and legal medicine at the University of Modena. From Livi he received a broad culture which added what he still needed to prepare him for the broader paths he was to follow. He gave himself diligently to all branches of the work before him, as teacher and examiner with students, and as a personal participant in scientific advance. He threw around his work an atmosphere of fellowship and social attractiveness which were devoted to the service and inspiration of his students.

He found opportunity for his administrative abilities in the direction for a brief time of the new asylum of Voghera and of his wider abilities in taking charge of psychiatry at the University of Pavia.

At the death of Livi in 1878 all power was put into the hands of Tamburini, not only for the carrying on of the work which Livi had left, but of making the Institute a more important center of scientific study. For thirty years Tamburini gave himself to this work, governing the institute wisely, enlarging its influence and building up its various forms of service to greater completeness. An important feature of his work was the care and attention he bestowed upon those who were dismissed from time to time from its care. His influence with the students who came to study at the richly endowed laboratories annexed to the clinical psychiatry made him indirectly a factor in many an extended field elsewhere.

He was called by the medical faculty of Rome in 1906 to fill the chair of psychiatry left vacant by the death of Ezio Sciamanna. This merely gave a larger field for his already manifested qualities and his manifold forms of interest. He himself was stimulated to a still more active interest in the field of psychiatry in clinical observation and in published work. At the same time his efforts were expended in the interests of the victims of mental disease, of tuberculosis, of alcoholism and he interested himself generally in matters of public health. Here his experience with the mentally diseased gave his opinions weight and he served in public capacity as a member of the Superior Council of Public Health and participated in many public measures relating to questions of hygienic welfare. He was recognized at home and abroad by membership in many scientific bodies, serving as president of the *Societa Freniatria*. He was appointed chief consultant in the organization for the health of the army during the war with rank of *Generale medico*, in which capacity he served in creating and carrying out the function of the neurological and psychiatric work of the service. This no doubt hastened the approach of the illness which finally caused his death.

Tamburini had a ready pen for reporting the result of his observations and long experience with psychiatric problems. He left valuable studies in histopathology, in the physiology and physiopathology of the nervous system, works on aphasia, cortical localization, psychomotor centers, on the genesis of hallucinations, on epilepsy, in all of which his interest in localization was combined with the psychical functional aspect of the question. He made notable contributions also upon forms of brain defect, microcephaly, cerebral glioma, etc., acromegaly and the hypophysis. He was interested also in following out the theories of Charcot in regard to suggestion and hypnotism and has written in the field of psychoses, obsessions, etc. He contributed also to forensic psychology. He planned a large

work "Trattato di Psichiatria" which should be a collection of work done in many lands, but was prevented by recent conditions from carrying this into effect. He was able however to write a long-meditated work "Assistenza e custodia degli alienati in Italia e nei paesi civili," which represented the result of years of observation of study of a subject which had always lain very near him, the care of the insane as it existed in Italy and abroad and the future of psychiatry in relation to the needs of the sick, a point of view always foremost with him. His activities were also marked in the obtaining of laws and regulations by which the sick could be provided for, but also medical and judicial interests be protected in the service of society.

His name is also known through the "Rivista Sperimentali di Freniatria" published at Reggio-Emilia and in which he made known the discoveries of such men as Golgi, Vassali, Marchi and others in the special fields of neurology and psychiatry.

SMITH ELY JELLIFFE

FRANZ NISSEL¹

In the year 1883-84 a medical student took a prize which was offered by the medical faculty of the University of Munich. The subject contested for was one toward which Ganser, at that time assistant to Gudden, had given the inspiration, "The Pathological Changes of the Nerve Cells of the Cerebral Cortex." This young man was Franz Nissl, born in Frankenthal in 1860, son of a gymnasium professor. His work proved astonishing through the employment of a staining method (with magenta red) which presented the cells in a clearness and beauty hitherto unknown. The young student had originally been destined for a clergyman and had been able to enter the medical profession only under severe struggle. From the first he had felt himself greatly interested in finer histology. Flemming's cell pictures had led him to believe that a similar goal must be reached in regard to the nerve cells of the cerebral cortex. After frequent attempts he came at last to discard the use of Müller's solution for hardening the tissues, generally in use at that time, and the employment of carmin stain associated with it, and hardened the tissues in alcohol, which up till that time had not been in favor. With this the way was open for the use of the anilin stain. Very soon after this the methylene blue stain was used instead of

¹ Courtesy of Prof. E. Kraepelin and Dr. B. Spatz.

the anilin and this has not to this day been surpassed. Of course Nissl well understood that the figures thus obtained, though so rich in the finest details, could not claim to represent finally the living tissues. He spoke therefore merely of "equivalent figures," the value of which lay in any case in the fact that it permitted of the distinguishing of altered diseased cells from sound ones.

The importance of this step in advance won by Nissl at his first entrance into science was beyond measure. Up to that time there had been no such thing as a pathological anatomy of the cortex, for the carmin figures showed only most incompletely the grossest changes in the nerve cells, to say nothing of the other parts of the tissue elements. No one was able at that time to distinguish between a section through a paretic cortex and one through sound tissue. The new staining however disclosed at one stroke a multitude of characteristic changes in the diseased nerve cells which could be followed most minutely. They also showed, which perhaps was still more important, a surprising diversity in the finer structure of the different sorts of nerve cells, which enriched the already complex picture of the brain structure by a multitude of new features.

Gudden, who was as far-seeing an investigator as he was an unprejudiced one, recognized immediately the significance of Nissl's discovery and offered him a position as assistant in the district insane asylum upon which Nissl entered as soon as he had passed his state medical examination on January 1, 1885. There began for him here a period of happy fellowship in work with the great master of brain anatomy, which was unfortunately interrupted by Gudden's far too early death. The influence of Gudden's work was however felt upon all Nissl's subsequent life work.

Beside his zealous coöperation with Gudden in his experimental work with animals, Nissl was urgently occupied with the creation of a pathological anatomy of the mental diseases. It was necessary first in order to carry out this purpose to secure the picture of the healthy nerve cells in their diversity of forms and to become familiar with all the sources of defect in hardening and in disintegration. Nissl undertook after this to account for all the pathological changes by which the equivalent figure in the most varied disease conditions could be recognized. So there arose the most exact description of the metamorphoses which the nerve cells can undergo. To these corresponded also general relations to the kind of injurious lesion which was being produced upon them, acute, severe, chronic changes, mixed changes which in the course of development of these lesions take place characteristically for each species of nerve cells.



FRANZ NISSEL

Nissl was nevertheless aware that these cell changes, the discovery of which roused the greatest expectations in the scientific world, could not by themselves alone disclose the disease processes which were taking place in the cortex. Just at the time of his first acquaintance with Gudden he learned from him the Weigert method of staining the medullary sheath, to which later was added the long-sought glia stain. Nissl recognized that an understanding of the cortical changes would be possible only through an equal consideration of all the tissue elements, the attainment of a complete picture. The same cell changes repeated themselves in quite different diseases. On the other hand it was to be expected that a definite relationship in the participation of the various elements of the tissues would be characteristic for each disease process.

It may have been this sort of consideration that led Nissl to occupy himself most intensively with questions of general histopathology. It was evident to him that the relation of the nerve cells, medullated fibers and fibrils, the supporting substances in their different forms, the vascular and blood cells under normal and diseased conditions must be accurately known if an actual understanding of the morbid processes taking place in the brain was to be obtained. It was just the laying of so comprehensive a foundation, the complete mastery of every possible hypothesis for the correct interpretation of what was observed, the constant keeping in touch with corresponding experiments in other territories which enabled him in a special measure to exalt histopathology of the brain cortex to the rank of a complete modern science. His fine intellect and his skill in technical matters fitted him well systematically to bring to the service of his investigations all means which in any way whatsoever stood at his disposal.

In February, 1888, he was compelled by illness to give up his position at Munich. After a long convalescence he became for a short time physician at the state asylum at Blankenhain, until he removed in April, 1889, to Frankfurt as second physician. Here where Sioli was busily engaged in remodelling the old institution, he came upon Alzheimer who was to become his most appreciative pupil, fellow worker and friend. Now began in the close application of daily service that remarkable coöperation of the two untiring investigators which has bound together for all time their names and made them milestones in the history of our science. While Alzheimer carefully examined the cortices of those who had died with mental diseases that he might obtain an insight into the disease

processes which had here taken place, Nissl turned chiefly to more general questions. For a time he sought diligently to follow out the relationships and interdependence between the various structural parts of the brain, employing and carrying forward study of the process suspected by Gudden in regard to the circumscribed lesions. Further he sought to explain the origin of pathological changes of the nerve cells, especially with the aid of animal experimentation. These latter researches strengthened him more and more in the conviction that a different significance must accord with the different structures of the nerve cells, a thought which stimulated him to countless further investigations. His frequent close relationship with Weigert, who at that time was working out his glia staining, was important for the perfecting of his work in general pathology. In this way a new and exceptionally important field for work was opened up to Nissl and Alzheimer.

Nissl's work had drawn to itself the marked attention of his colleagues. It was generally recognized that there had appeared here an investigator of quite unusual gifts and character as well as of absolute reliability, who knew how to point out new paths to our science. It seemed fitting that he should be secured for academic paths. But the accomplishment of this was difficult because Nissl had already reached a position in life in Frankfurt which no clinic could give him. However I entered into negotiations with him and had the indescribable joy of obtaining from him after long consideration his consent to his removal to Heidelberg. The readiness of the administration at Baden, which deserves our gratitude, had made it possible for me to secure for him with us at least half way acceptable conditions, yet his decision meant a serious sacrifice for him.

Nissl came to us in the autumn of 1895. I was concerned, as may be easily understood, to create for him as free opportunity as possible for his scientific work. While on the one hand he brought to conclusion, with great labor and under internal difficulties, his book on the theory of the neurons and their dependencies, he turned on the other hand again to animal experimentation in order to pursue toxic effects upon the cortical cells. He was able to show through the action of the "subacute maximal intoxication" devised by him that the nerve cells suffer sometimes completely distinctive changes through the different toxins which, without further consideration, permit one to draw conclusions concerning the sort of pathological process which is at work. The establishment of this fact was of particular importance because before this the alterations discovered in the diseased cortex showed no apparent closer relationship to the

form of the causal disease process. Nissl represented the characteristic cell formations very skillfully by means of microphotography which had been introduced into our field a short time before by Dehio at my instigation, and of which Nissl soon obtained a masterly control. He sought also to represent pictures of the entire cortex in such magnification that in them all the fine histopathological details were recognizable. Many a night have I worked with him on these things until dawn in the basement room which was set apart for this. Every cortical figure, had to be put together from three separately made photographs of adjoining portions. It is to be expected that these studies will win great importance later for the circumscribing of the finer disease processes.

In 1896 Nissl took his degree with a work on chronic disease of the cell. It was not printed any more than the work for his doctor's degree for he could not bring himself to publish it because of new considerations which were all the time arising. There could not fail to gather about him gradually a circle of students who worked with him, some of them foreigners, among whom the Italian Cerletti and the Norwegian Ragnar Vogt may be especially mentioned. The picture of the changes in the paretic brain, as it was formed by the action of degenerative and inflammatory processes slowly became clear. Vogt was able to establish, under Nissl's guidance, the rôle of the plasma cells in these processes. Researches followed upon this work concerning the syphilitic changes in the brain, especially in regard to the endarteritis of the small vessels, toward which Nissl to be sure entertained some doubt to the last. Incidentally he described the condition of the brain of a mentally diseased dog. Devaux brought with him from Paris the first report of the cell increase in the fluid in lues and general paresis. Nissl eagerly seized upon the newly discovered aid of lumbar puncture and devised a method for determining quantitatively the albumin content of the spinal fluid.

Nissl by no means neglected the actual service of patients in spite of his intense devotion to anatomical research. As a pupil of Gudden he was accustomed to give the most careful medical attention to his patients. He acquired also a vital interest in the problems of clinical psychiatry and gladly participated in our efforts of that period to circumscribe disease pictures. His aversion to hasty conclusions and presumptuous assertions was therefore of particular value to us. He took up with much interest the field of hysterical and epileptic disorders.

In the year 1901 Nissl was made adjunct professor. My call to

Munich followed two years later. Shortly before this Alzheimer also had come to us at Heidelberg for the purpose of taking his degree in the faculty. My most earnest desire was to take both of the investigators with me to the new Munich clinic, which could not however be opened until November, 1904. Meanwhile my successor Bonhoeffer had gone to Breslau and Nissl had been called to take his place. Now all at once he had become a clinician and had to bear the entire burden of the medical direction, instruction and examinations. That was the more disastrous for him since he did not understand how to make things easy for himself and let others work for him. In spite of this burden he was indefatigably busy at work to advance the science to which he had given the foundation. Together with Alzheimer he brought out the collection of histological and histopathological works in which first of all the picture of the anatomical changes in general paresis was most exactly worked out in all directions by both investigators. After this he took up again his animal experimentation, to win now a surer foundation for the solution of the great questions always pressing closer in regard to the significance of the stratification of the brain cortex.

Nissl's unexampled representation of the various forms of nerve cells had come to be the starting point of the topographical cortical histology for the basis of the cytoarchitectonic. Vogt and Brodmann had succeeded in limiting in a purely anatomical way a long series of cortical fields different in structure, which in part could be used as a guide to the location of special mental functions. Through Nissl's efforts the Heidelberg Academy put a certain sum at the disposal of Brodmann to be used to carry out these researches. He himself however took up this question from a different side. While he succeeded in an animal in freeing the cerebral cortex from all its connections, he brought most weighty proof that the transverse section of the cortex represented no unity, that the deeper layers show a much closer dependence upon the structures which lie beneath them while the upper layers stand in complete independence toward them. This discovery gave strong support to his long-cherished opinion that a difference in function corresponds to the difference in structure of the nerve cells. It permitted plans to ripen which occupied him to the close of his life. With the help of circumscribed disturbances he hoped to be able to prove how far also differences in the relations of dependence of other portions of the brain corresponded to the cortical fields anatomically circumscribed.

A further promising undertaking, which to be sure could lead to results only in his master hand, was the collection of individual ob-

servations which he had made with equal care clinically and anatomically and which he published. After laying the broad general foundations of pathological histology, toward which thus far his work had particularly counted, he turned conscientiously to the explanation of definite diseased processes, of which up to this time general paresis and brain lues had chiefly occupied him. We had occasion to discover how fruitful this form of investigation could be in the last lecture which he delivered at the meeting of the German institute for psychiatry. He gave here with the most detailed consideration of clinical observations a representation which entered into all the finest details of the condition in a case of subcortical encephalitis. The thoroughness of the lecture as well as its broad outlook made it one never to be forgotten by all who heard it.

Unfortunately Nissl's strength suffered from a kidney disturbance which appeared in 1909, as well as from his work, so he was obliged to spend the winter of 1910 in Egypt. The condition of his health after this remained uncertain and laid upon him frequently the necessity of care. It was exactly these circumstances which made it seem particularly desirable, when in the year 1917 the Deutsche Forschungsanstalt für Psychiatrie was founded, to release Nissl from the trammels of his position and provide for him the possibility of a purely scientific activity. A convention in Munich in the summer of 1917 gave an opportunity to discuss these questions with him and in October I was able at a visit in Heidelberg to conclude his call to Munich. He came to us in Munich at the beginning of April, 1918, to the joy of us all, eager to take up his work at once.

He was occupied first of all with the completion of investigations which had been carried through long years in regard to the connection between the brain cortex and the thalamus opticus. He was able to prove through extensive animal experimentation that the countless cell groups of the thalamus sometimes stand in relationship with quite definite cortical fields, that for this reason the thalamus is important as a central point for a large number of fiber bundles running together from the most separate regions of the cortex. He was working on a model that should faithfully represent these connections in magnified form and thought that he would bring the most important results of his researches before the recent neurologic convention at Baden. He planned to go deeply into the brain changes in dementia præcox after the completion of this work and then to take up comprehensive investigations upon animals in regard to the relationships of the different cortical fields to one another.

It was not permitted him to carry out these far-reaching plans so highly important for our science. In June his old kidney complaint had already made itself more noticeable. But he seemed to have made an excellent recovery under Romberg's treatment in the hospital and he was again able to take up his work. At the end of July, however, his condition again became bad and now a serious uremia developed to which he succumbed on August 11.

Nissl belongs to those men whom one never forgets, even though one came into contact with him but once. This was due not so much to the birthmark on his left cheek which made him conspicuous as to the fresh originality of his personality and the unusual vivacity of his mind. It need not be especially emphasized that Nissl was a distinguished observer whom not the most insignificant detail of the object observed could escape. Besides he possessed a thoroughness in research which was stopped by no obstacles, by no difficulty, but above all an almost cruel self-criticism which could not be corrupted and which controlled all his thinking and a boundless caution in regard to all conclusions. Because of this he could scarcely do enough to satisfy himself in objections, reservations and often-repeated testings. Therefore the exceptional trustworthiness of his statements, which assured him the unconditional confidence of his fellow workers. It was with difficulty that he brought himself to the writing even of letters. He strove with his expression, sought always after filling out and emending, and could not come to the conclusion. Nissl was entirely filled with a sacred compelling power for the truth which made him combat regardlessly every self-deception, every rash presumption in himself or in others. He held himself sharply from theoretical systems and dogmas; only the facts and the proof of anything counted with his entirely straightforward thinking. The weight of a personality which stood in place of a purpose made little impression upon him. On the other hand, he was always accessible to actual basic things even when he felt them to be counter to his opinions. Thus Nissl was an investigator of nature by the grace of God, one who unswervingly followed his calling and with far-reaching vision from the first strove conscientiously after a remote but clearly recognized goal.

An essential condition for the results he obtained was his astonishing, indefatigable industry. Nissl knew scarcely any other pleasure than his scientific work, to which every free hour was devoted. He did have artistic interests as well and was a skillful performer on the piano, but he limited such tastes to a very modest place in his life. He looked upon walking as a kind of waste of time yet he was

fond of travel and enjoyed it, traveling to Greece and Constantinople, to Naples, where he worked at the zoölogical station, to Sicily and to Russia. He took pleasure in nature, in animals and in children, yet he never married.

His inner personal life showed that childlike purity and originality which so often accompany inner greatness. Pettiness and baseness of character always remained incomprehensible to him; he stood weaponless against them. A fundamental feature of his nature was his goodness and kindness. He could scarcely deny any one a request and on this account was not infrequently imposed upon by intrusive solicitors. He looked after the needs of his sick with touching patience and sacrifice, so that they clung to him with true affection. The softness of his feeling he hid behind an impenetrable reserve and an occasional harshness. Although he met every one naturally and kindly he almost never permitted even his most trusted friend a deeper look into his inmost feelings. He was conscious of his own worth but the inadequacy of the human spirit toward the eternal problems of science filled him with deep humility which stifled every impulse of vanity within him. Nothing was more offensive to him than a puffed up and frothy conceit, toward which he could use the hardest terms.

In personal intercourse Nissl was always cheerful and animated yet in his hard struggle for truth gloomy doubts and despondency were not foreign to him. He had a keen sense of humor and was not averse to jokes upon himself. On the other hand his reserved mode of thought withheld itself from the light play of wit and intellectual skirmishing. He showed in all his operations a painful love of order and exactness; unrestrained broad channeled letting himself go without attention to details was impossible to him. His life was simple and without reproach, in many things somewhat odd. He liked his comfort, but the good things of this world, honor, fame, and possessions, weighed lightly for him over against the irrepresible striving for knowledge which dominated his entire soul.

Thus he stands before us to-day, a true pupil of his great master Gudden, a pioneer in our science and a man with a heart rich and pure, a shining example for every seeker after truth. Great hopes are destroyed through his departure, but so may we also be thankful for the good fortune which permitted him to arise among us. His lifework will be an indestructible monument as long as German science exists.

E. KRAEPELIN

MUNICH

LUDWIG BRUNS

Owing to the irregularities of communication with German neurology in the past few years a complete notice of the death of this eminent neurologist has been omitted. Professor Bruns died in 1916 at Hanover at the age of 58. Trained under Hitzig of Halle he had devoted a life of diligent and active service to various forms of clinical neurology. The number of his publications, eighty in all and all but one upon neurological subjects, testifies to the conscientious faithfulness of his work while these writings are marked by the skill and vital interest as well the thoroughness and exactness with which he approached his subject. These qualities give them rank in the progress of neurology for while he was zealous to enlarge his own knowledge of the problems confronting him his work was of the sort that produced definite results in practical knowledge for the advancement of his profession.

His monograph upon tumors of the central and peripheral nervous system is one of the best things produced on this wide subject. This work was first published in Nothnagel's "Special Pathology and Therapy." He gave his intensive study to this field and had therefore a share in the advance of brain surgery, which was forwarded by his studies. He published in addition many other contributions upon tumors of the brain, diseases of the spinal cord, as well as upon other neurological subjects. In all his writings as in his teaching he set a standard of thoroughness, of high aim and interest which proved a stimulus to many. The sympathetic nature of his professional interest, one that realized the humanity of the problems before him, is shown in his appreciative work on hysterical development in children. He realized the peculiar sensitiveness of childhood and the dangers to which this is exposed. He collaborated with Ziehen and Cramer in the publication of a work in which his views were set forth, "Handbook on Diseases of the Nervous System of Children." He was also closely associated with Oppenheim in work on the traumatic neuroses. The war added to his duties and he performed diligent service as neurologist until shortly before his death.

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MENTAL DISORDERS ASSOCIATED WITH OLD AGE

BY SIR GEORGE SAVAGE, M.D., F.R.C.P.

OF LONDON, ENGLAND

Recently I have contributed to the Osler Testimonial an article on "Normal Old Age," and it seems to me very important that I should also give my experiences of the mental changes which depend chiefly on old age.

You have all heard, over and over again, that you are no older than you feel, that you are, in fact, no older than your arteries, that your vessels and the condition of your circulatory system are really the gauges of your age. This is all very well, but I do not intend to enter on the pure pathology of senility. The lecture will chiefly be clinical, giving my experiences of cases, and their sequelae.

Oliver Wendell Holmes developed, in his "Autocrat of the Breakfast Table," the very original idea of the possibility of a certain carriage which was called "the One-Hoss Shay," which was so absolutely perfectly constructed that all its parts decayed uniformly, and at the end of a hundred years its various parts dissolved, and nothing was left of it. As far as we are concerned, we do not dissolve in a uniform way: we do not follow such simple lines. Devolution, with us, is in parts, and I shall refer, in some detail, to the way in which these parts disintegrate.

One very important consideration is the hereditary quality of old age. I have constantly come across families—and I may say some of the most distinguished men have belonged to such families—where the average age of each individual has been between sev-

enty and ninety; and in those cases it has not been merely existence, but the men have been able to hold their position in the world up to at least eighty years of age.

Loss of Memory.—I will next refer to loss of memory which is morbid. One of the most characteristic evidences of advancing years is the natural loss of precise memory, the memory for names. Of course, healthy forgetfulness is all right, in fact the epigram that “knowledge is the result of forgetting” is noteworthy. But beyond that, loss of memory, more particularly for recent events, is a very distinct evidence that our limitations are being reached. I have frequently met with patients who, failing to recognize their immediate relatives, still have recollections of their long-lost parents and believe they are still existing. An important medico-legal point may often arise. Thus, I have seen an old lady of eighty to whom I have said, “Well, I have come to see you,” and, without any hesitation, she said, “But I think you had better see my father first,” the father having been dead for half a century. You may see, as I have said, how a very important medico-legal point may arise. Thus, I knew a man who had had four sons. Three of them had died, but he made a will leaving his money equally among four, though only one was surviving. These lapses of memory may, consequently, lead to serious complications in reference to wills.

Take this as an example. I was consulted about an old man who was left a widower, and who had one daughter. He was devoted to this daughter, and thought she was indeed devoted to him for life. But a Colonial gentleman came into the neighborhood, she fell in love with him, and they married and went to a colony. The father, selfishly, said, “I have done with you, I want no more of you: you might, at all events, have waited until I died before you married.” Years went by, and the husband died. She had no family, and hearing that her father was weaker and failing in health, she determined to come back to England to nurse him and live with him as before. The old affection on the part of the father seemed to have returned, nothing, apparently, could have been sweeter than the reunion of father and prodigal daughter. But, as time went on, his memory failed more markedly, and he forgot the immediate relationships of his returned daughter, he could only think of her as at the time when she had left him; and again he exhibited his personal antagonism towards her, and would not see her, and determined to leave all his property away from her. This, of course, was a most unnatural and, one might say, a wicked thing, but it was a result of mental decay.

There was another extraordinary case, equally interesting. When I was physician at Bethlem Hospital, a man aged seventy-four was admitted. The statement on the certificate was that he had threatened to murder his wife, a lady sixty-seven years of age. As was my custom, I had a long talk with him quietly and alone soon after his admission, and, in the calmest way possible, he said, "Yes, it is true that I said I would injure my wife, but I really was justified." I asked, "Why?" "Oh, because of her immorality." I said, "Immorality at sixty-seven or sixty-eight?" "Yes," he said, "it is perfectly true, and if you challenge her I think you will find she admits that she was at fault." I asked the wife to come up from the country to see me, and this was her history: Forty or more years previously she had married her husband, though she was in love with a cousin. This was, however, a much more suitable marriage, and the relatives had objected to a cousinly union. Therefore she accepted her husband, and lived with him for some time quite happily. After a few months she went to her home, merely on a visit, and there she met her lover cousin, who took advantage of her. She felt heartily ashamed of herself, and went back to her husband and made a full confession to him. He was reasonable, and said, "Well, it is very sad, but I really do not blame you: the whole incident shall be forgotten and never mentioned between us as long as we live." And thus they lived for many, many years, and brought up a healthy family. When, however, he was between seventy and eighty years of age he suddenly turned against his wife, called her a prostitute and a whore, and suchlike names, and threatened to injure her. Under these circumstances he was sent to Bethlem. There, you see, the whole of the forty years seem to have been lost, the skeleton was disclosed. And, poetically, I said, "The sands of time have been swept away and laid bare the skeleton: if we wait long enough, the skeleton itself will be washed away too." And so, as it happened, months passed away, and once more there was peace, though with mental weakness.

A very important point to remember is that a man's memory may be extremely bad, and yet his capacity for making a will may be quite good. If you give a certificate as to the testamentary capacity of anyone, you will generally say in it that the man is "sound in mind, memory and understanding"; it is not necessary, however, always that the memory should be good. Take the following as an example:

I went down into the country some years ago to see a wealthy land-owner who was suffering from great loss of memory, and his

sons were very much concerned about him and the management of his affairs. One point was this. He had a certain landed property which his sons thought it advisable to sell. The father was weak in memory, and somewhat weak-minded, and they did not wish to do anything that was illegal or unjust. I was introduced to him, and he was very friendly, and asked if I was going to spend the night at the hotel; nothing, in fact, could have been more gracious and polite. When I spoke to him about his property, he seemed to remember all about it. I said, "Are you willing to sell it?" At once he replied, "Yes, except a certain part," and he pointed out on a diagram what the part was which he wished to retain. He said, "A railway is coming close to that, and that will improve the value of that property; therefore I should prefer to retain that." Half an hour afterwards I was reintroduced, and he said he had never had the pleasure of seeing me before, but that he would be very glad to talk over business with me. We again got on the question of the property, and once more he clearly said, "Yes, I am willing to sell, except that part." I saw him again after dinner, and the same series of events recurred. "I have come down from London," I said, "to see you." "Oh yes, very kind of you, but I have never had the pleasure of seeing you before," and again the same process was gone through. I saw him again the next morning, before I returned to London, and the same forgetfulness was evident. I therefore reported that this man, though deficient in recent memory, was quite capable of giving instructions for the disposal of his property.

Another and, I think, the most startling example of what might be called temporary loss of memory I encountered only last year. A man from West Australia, a coarse individual, who had made an enormous fortune, was supposed to be the best judge of cattle in the district. At any rate, he was a very rich man, and I may say he had been very intemperate. Physically, he was a very powerful man, but he was one who had indulged himself in every way. I was asked to go into the country to see him in order to witness his will. His general practitioner was there, also a neurological colleague, and his lawyer was present to assist us. I said to him, "Very well, but where is your will?" The will was brought, and, section by section, I went through the will with him, and made objections to one or two items in it. He was a man worth, say, £20,000 a year, and he had suggested that his two children should not be allowed more than £100 a year until they were twenty-one years of age. I said, "This is ridiculous, and might be very injurious to their prospects and their education." For his wife, who was much younger than himself, he

had made a provision that as long as she remained single she should have £15,000 a year, but if she married, it was to be reduced to £2,000 a year. In reference to this again I said, "I do not consider this is just." But most clearly, and apparently consistently, he argued his points and there could be no possible doubt that he fully understood at the time what he was saying. So the will was signed, and I witnessed it, by that act conveying my impression that he was of sound mind and memory and understanding, and that his will was a proper one. Some weeks afterwards I was again sent for to see him. When I arrived at their house, I was surprised to find him in the hall waiting to see me, because when I had seen him before, he was bed-ridden with general edema and dropsy, and he had a considerable amount of albuminuria, and we all thought his remaining life would be very short. He said, "You do not seem to recognize me," and I admitted that I had not recognized him, and he did not seem to recognize me. "No," he said, he did not remember ever having seen me before. I then made use of a favorite axiom of mine, "To the alcoholic all things are possible." At all events, I was astonished to find a bright, dapper little man, who was evidently enjoying his cigar, and apparently quite normal. After a short interview, he said he really wanted to talk to me about a will that he had made some time ago. I tried to recall to his mind the fact that I had been present at the signing of that will. This he was hardly prepared to admit, because, he said, he remembered quite clearly most things, but he could not recollect making that will, and certainly he did not recollect seeing me at the time. We went through the will again, and he at once admitted that the conditions which he had imposed in regard to his wife and the regulations he had made or intended making for the welfare and education of his children were unreasonable, and proceeded to alter them. So here was a case in which a man had a complete lapse of memory, yet his reasoning power was, apparently, left quite clear. It was fortunate, I think, that there was a return of memory enabling him to do what was right, for he only lived a short time after the altering of the will.

In speaking of the mental disorders associated with old age, I have been in the habit of making use of the word "denudation." Just as in geology the structure of rocks and the contour of country are made evident by the loss of the superficial strata, so also with mind. There may be a loss of certain intellectual or mental capacities that disclose certain others. There is an extraordinary condition in which recent events are forgotten but older experiences are very vividly recalled, just as with hypnotic experience it has been seen

that a person who has been hypnotized has, during the hypnotic state, recounted events that have occurred in his extreme youth, or even in infancy, of which he had no recollection during his normal waking life.

As to the revival of forgotten incidents, I may give this as an example. I saw an old officer who had served in the Crimea, and whose mind and memory were very defective. But when he began to talk about the Crimea, he brightened up and gave me most wonderful accounts of what had happened. Then he entered into details. For example, he said, in one of the trenches a funny thing happened: a brother lieutenant had a button shot off his uniform, and this seemed to have saved his life, for the bullet had glided off after its impact on the button. He told me one or two other details of his life and experiences in the trenches. I said to his son and daughter, "Have you ever heard of these things before?" They replied, "Never." I asked whether they could find out if they were true. They said they would try. After a good deal of searching, they found, from other officers, that the accident which he described had occurred: yet it had never been talked of by him until the present time. You must remember that with loss of memory there may be denudation, which may be very dangerous, as in the instance of the prodigal daughter which I have related. Loss of memory is supposed to be definitely associated with loss of brain function in some way.

The next matter I want to refer to is loss of self-control associated with defect of mind. Hughlings Jackson, years ago, pointed out that there was layer upon layer of the nervous system, and that the last developed was the highest in function, the great controllers, as it were, and that by the removal of something, power seemed to increase: *i.e.*, control being removed, the next function or part of the brain reacted to stimuli much too vigorously, so that with loss of control there was exaggerated or increased action.

Let us look at this relationship of loss of control. First of all, you will find that one of the most troublesome of the minor symptoms is the restlessness of old age, which exhibits itself in various ways, differing with the sex. I think that some of the martyrs of society are the sisters, or the only daughters, of senile women, who are always "on the go," first of all domestically: the servants do not get up early enough. The fussy old lady is up at six o'clock, disturbing everybody then and during the rest of the day. She goes to her bedroom and—she thinks—tidies it up. She *begins* to tidy up, because of course the first process towards tidying is untidying, and,

as a rule, she never gets beyond that. The whole restlessness of these people is extraordinary; it seems as if, with them, there was an energy quite out of relationship with the otherwise feeble bodily state. Men, on the other hand, often develop grandiose ideas. In fact, in earlier years, I mistook some of these cases with extravagant ideas for cases of senile general paralysis. Individuals ranging from sixty to eighty years of age were seen by me and they told me they were never stronger, never better in their lives. And unfortunately, in many cases they felt sexually potent and wanted to remarry. They then proceeded to tell me what they were going to do: the inventions they have made and the investments they purpose making. Many a senile man has ruined himself with this restlessness, with this belief in himself, which has led to his having so many "irons in the fire" that they finally succeeded in putting it out. I remember the case of an English nobleman who, suffering in this way, caused a great deal of trouble. His father had a lot of valuable heirlooms, and the son was so afraid they might be stolen that he was always hiding them, and he hid them so completely that some of them were never found. I remember cases of restlessness and forgetfulness which were awful nuisances: servants were accused of stealing things which the old people had secreted somewhere and had forgotten where they had put them. Such a man will, frequently, start fresh schemes, and not uncommonly will follow his grandiose ideas out. I do not know whose the epigram was, but someone said that what these people lose in virility they gain in verbosity. At all events, there is much truth in the epigram; this restless loquacity is extremely distressing.

There is another awkward feature which leads to all sorts of troubles, namely, disturbed sleep: the sleeplessness of old age. If you belong to any London clubs, you will notice that, at about five o'clock a third of the members present are asleep, the older ones particularly, and they are the men who complain that they do not sleep much at night. Mind you, they do not sleep better at night if they do not sleep in the day, a rather interesting fact. Some of these men will go to a Turkish bath, or to some other place where they can have a couple of hours sleep in the afternoon, and yet they will sleep equally well—or equally badly—at night.

Another serious complication due to loss of higher self-control is the hysterical, the emotional condition. It is the commonest thing, which any of us who are old recognize, that tears are much nearer to the surface than they were, that the novel will now more easily arouse emotions and feelings in the throat than it would formerly

have done ; that the play which, as a young man, you smiled at will, now cause you to feel tearful. This is only the beginning : it may lead to many other complications, the more serious ones being the sexual. What may be called the less abnormal kind of case is that in which an old man marries a young woman. That, of course, may or may not lead to serious consequences. I have seen some of the most disastrous results in such cases where a young woman believed that she did not require sexual enjoyment and married an old man, with the result that, later, she developed abnormal sexual tendencies, frequently with intense, and even dangerous, jealousy.

Associated with this emotional weakness is another complication that, not infrequently, leads to testamentary trouble. I refer to the way in which an old man is influenced, particularly by servants, or by others who are in close contact with him. I remember having to go down into the country to see a retired military man, nearly eighty years of age. He had a man-servant who had been with him for some years. He had been a most valuable and attentive servant, and had remained valuable while he was treated as a servant. But when the servant saw his master getting weak-minded, he dominated him, and assumed the position of companion. I was going to say his familiarity exhibited itself in a complicating but rather amusing way, for this valet-companion took to racing, and used to get the old major to advance the money for his bets. The result was that the officer's affairs became seriously affected by this man.

So that on the hysterical or emotional side you must recognize loss of self-control and a tendency to be influenced by younger people, by people in their immediate environment. Old men are particularly thus influenced by young women.

Then comes the saddest kind of class of all, cases in which men of the very highest reputation do some foolish, dirty or wicked thing. Take this as an example.

A professor, who had been looked upon as the most godly of men, when going on a railway journey, got into a carriage the only other occupant of which was a messenger boy, and he was accused of attempting while in the carriage to abuse the boy sexually. The trial was held, and though the straightforward evidence of the boy was very striking, such was the evidence as to high moral character brought on the professor's behalf, so overwhelming was it, that no jury could believe that this man could have been guilty of such a serious fault. However, he made an attempt at suicide, and, later, had to be placed in an asylum, where he developed melancholia—if one can describe as melancholia a definite belief in his own wicked-

ness and a confession that he had been guilty of the fault of which he had been accused. And, practically, one is perfectly certain that he was guilty, and that the fault was the result of senile mental changes.

Again, I recall the case of a Member of Parliament who, losing higher self-control, associated with women of the lower order, and, in fact, in one case took a "woman of the town" down to his old university and wished to introduce her to the head of his old college. I often think of the pathetic end of some of these cases. Thus, there was an old clergyman who had been a distinguished scholar at his university, but who, as years advanced, lost his higher self-control. Fortunately, he had a very capable wife, who was literally his guardian angel, and enabled him to get through the simple duties of rector of his parish. However, she died, and from being a very well-dressed dapper English clergyman, he became slovenly: he neglected to shave, and was often very careless about his general appearance and about his behavior. He would neglect the ordinary calls of nature, and would be seen going about his parish wet and dirty. At length the bishop suggested that he had better take a long rest. His wife, as I have already remarked, had died. He came up to London, with no one to look after him, and the poor old man fell into the hands of women of the lowest order, who bullied him and got everything from him. His reputation was gone. Then, fortunately, he passed into a condition of senile dementia and died.

There is an accompaniment of this loss of control which is noteworthy. I do not know of any age when self-abuse may not be indulged. I remember a man over ninety years of age at Bethlem Hospital who was guilty of this vice. Of course, in the majority of these cases there has been a period of thirty or forty years during which there has been nothing of the sort, and this indulgence has only come with the loss of the higher self-control. One of the most distressing symptoms in elderly women is this disregard of what might be called decency. I have recently seen a lady who, when I went into her room, without the slightest hesitation or provocation pulled up her clothes. Such cases, of course, are distressing for all concerned.

Having dealt with defects of memory and self-control, I now want to speak of mental depression, so-called senile melancholia. I suppose that some depression is normal for a large proportion of men, particularly as they get old. Weight of years shows itself in two ways, in two very marked directions. In one of these the bodily trouble is the chief one: these are the senile hypochondriacal cases,

and they are very numerous and hard to treat. I have been seeing, recently, an old man who, in many ways, if he can be got to play a game of billiards or bridge, for instance, will forget his troubles, but when these stimuli are removed he will sit with his hands covering his abdomen and complaining that there is no good, he has a stoppage, a blockage, and that he is dying. "But," I say, "has nothing passed through your bowels?" "No, nothing for months." "But you are losing weight, and yet you take food." "Yes, but nothing passes." In years gone by I examined the nervous tissues and sympathetic systems of a number of these patients, but there was nothing very special that I was able to detect in them.

The next and, perhaps, a still more common failing is loss of ability: in fact many of these cases of senile melancholia are only what I call morbid mental growths. The individual who has been conscientious becomes over-conscientious: he thinks he has not done right, that he cannot do this and that, yet still he prefers to continue struggling to accomplish it. He has lack of ability, lack of the power of concentration, a feeling of dependence upon others, and yet there is a dread of his giving up the reins. The old father clings to business, and will not grant a power of attorney or any other authority to his managing sons.

And I would like to mention a case of what I may call the saturated solution of grief. The saturated solution crystallizes out in some morbid form or another. You may, for instance, meet a parson who is satisfied that he never fulfilled his religious duties. As one bishop said to me when suffering thus, "I was never fit to be a bishop," and I replied, "Nobody ever was, so be content." However, in him it showed itself in depression in that way; he felt that he was unworthy. Just as the young medical student fears aneurysm and heart disease—at least he used to in my student days—so the old doctor thinks he has cancer. Supposed aneurysm is another cause of the miserable feelings of the middle-aged doctor. The business man, naturally, shows his defect in believing that he is ruined, or that ruin is impending for him, and that nothing will prevent this ruin. In him reason and feeling run like two parallel lines, they do not meet, but keep separate. Let us take an example.

A man whom I had to see, a very rich manufacturer, said he had the idea that he was ruined. I said "It is nonsense." He said, "You know, I am very sorry, but you will not get your fee, there is no money at the bank." I told him I would risk that. He said, "It is no good, I am absolutely ruined, and the bailiffs are at the door." I said, "I will see you again in a fortnight, and I will, in the mean-

time, have your bank pass-book, with a report from the manager of your works." Armed with these pieces of evidence, I went to see him again. He looked at them carefully, and then calmly said, "Yes, but that was the day before yesterday; to-day, now, I am ruined." Feeling overrides all reason in such cases. Over and over again one tried, but without avail, to reason with people, hoping that by repeating and repeating, they would be convinced. I have recently seen a distinguished medical man who was fully persuaded that he had been a fraud all his life. At the same time he believed that he was suffering from some infectious disease, and that he would have to be put out of the way.

There is one axiom I would strongly impress upon you: Every senile melancholia patient is a suicidal person. Look at the reports of suicides in the daily papers and note the number between the ages of sixty-five and eight-five. These people have a feeling of unworthiness. The clergyman rarely does it, nor does the man who believes himself to be eternally damned. One such said to me, "I am going to Hell anyway, but I do not wish to go prematurely." There is, of course, something in that! At any rate, you have to think of the business man, and the man who thinks he is sexually impotent as the most suicidal.

This is the way it comes about. A man loses self-control, re-develops sexual desire and, to a certain extent, sexual power. Then he loses it altogether: he worries himself because he is now, though old, impotent. Parenthetically I may say that bridegrooms who commit suicide just before or just after marriage do so, in the majority of cases, because, emotionally, they believe themselves to be impotent.

Let me give you an example of the suicide danger. I was asked to see a shipbuilder in the city. His son said, "Father will not come to see you, he will not admit there is anything mental the matter with him: he says it is financial. If you were to go to see him, he would say, 'Give me a cheque for £10,000 and it will be all right, but as for medicine, that is out of the question.'" The son added, "We are not sure of him." I went to see him. He received me very politely, and said "It is not a question of a doctor, I am a ruined man." There was some ground for the idea, for just before my visit, one of his big ships had failed at the launching; it stopped on the stocks instead of taking the water. Later it was duly got off, but this first failure started the impression in his mind that he was a ruined man, for he felt that the government would no longer have confidence in him. I suggested to the son that his father was, al-

most certainly, suicidal, that there was only one thing to do, and that was to provide a nurse-companion, to take him from the office at once, and keep him away, without letting him go home. I told them to take him to some quiet country place. They did so. They found a loaded revolver, a razor—he did not shave—and poison. That man had made up his mind to take his life because he believed he was ruined. As a rule, if the doctor does anything of the kind, he takes poison, but the hypochondriacal doctor has experience and knowledge enough to realize that even cancer patients sometimes improve, and doctors are not so suicidal. I believe the most suicidal type of man is the merchant who believes he is ruined.

We have discussed loss of memory, loss of control, and exaggerated self-consciousness; and now we shall speak of a group which presents a good deal of interest, that in which there is pure sensory disorder, hallucinations. It has always interested me to notice that with devolution and dissolution you get similar sensory disorders. The youth who is on the road to dementia præcox and is a frantic masturbator has hallucinations of smell. He also has visual hallucinations and thinks he sees people in his room; in fact the state is very nearly allied to a delirious one. I have always felt it to be interesting that the organ of smell, though a lower one, is still very highly organized, and it is closely associated with our whole mental growth. It is interesting that it should show disorder in devolution and also in adolescence. I constantly have met old men who complained bitterly about the drainage or the ventilation of their houses. One man told me it was perfectly useless, that he cannot get on, that his wife will not understand that they have a bad cook, and that there are always stinks about the house. I will tell you of the most tragic instance of this that I remember, though there was a comical side to it also. It was the case of an old doctor who had a large practice in the neighborhood of London, and who had known me from childhood. His wife wrote and asked me whether I would come and dine with them, so that I could see her husband, and advise her as to his mental condition, as she was very anxious about him. I went. The first thing I noticed was that he was very restless and that he was untidy. He said, "I am very sorry, but you will not be able to have any dinner." When I asked why, he said, "Oh, I have discharged the cook." Again I asked why. "Oh," he said, "the whole place is stinking fish. And I am afraid I cannot send you home, because I discharged the coachman, the stable was in such a filthy condition, it smelt awfully." It was a trying experience for me, to a certain extent. A week later, I had a communication from

the authorities, asking what I thought of Dr. So and So. I asked what the ground of enquiry was, and they said, "Oh, he is medical officer of health, and he has given orders for the drains to be taken up in several of the leading streets." Naturally, I stopped this, but one can see what a serious complication might have arisen had it not been recognized that he was suffering from mental disorder. A short time afterwards, he had an apoplectic seizure, and died.

I would mention, also, hallucinations of sight. These are very interesting. I had to go down to the West of England to see a wealthy old bachelor, who had been a big coal owner. He had what might be called a kind nephew and a hard nephew. The former said, in effect, "Let the old chap live in his own house with someone to look after him, though he is a little bit troublesome." The other, more businesslike one, said, "The old fellow is a fool, let him go to an asylum." It was decided that I should go down to see him, in order that I might give my view as to whether he should be treated at home or sent to an asylum. I found in the old man many signs of degeneration, but he was a charming personality and, like so many merchants, he had developed tastes and had become a collector of pictures. He took me round and showed me these pictures, told me all about them, and how much he gave for them. Suddenly turning to me, he said, "What a nuisance!" I said, "What?" He said, "Don't you see the water running across the floor?" I said, "Why, there is no water." "Do you mean to say you don't see it?" he said. I replied, "Put your finger down there." He said, "That is all very well, but I put blotting paper down, and it does not get wet, yet there it is, I tell you." Looking out into the garden, he hastily said "You see that old rabbit and her young?" I said, "There is no rabbit." He said, "There is, running into the laurel bush." I said, "No. Look here, if I get a gun, will you shoot it?" After some hesitation, he said, "No." And in this case it is quite clear that there might have been danger, because on one occasion he fancied he saw burglars, and fired a revolver out of his bedroom window.

The next also might have been a serious case. It was that of a lawyer with a very large city practice, and he had a very large number of trust securities. One Christmas Day, some years ago, he thought he would go down and have a look at the securities by himself, with no clerks or other people in the office. He went, and got out securities for many thousands of pounds, and looked carefully over them. Then, turning round, he thought he saw his son, and said, "Well, you can put these things away," and then went home. His son, fortunately, went early next morning to the office, and

found on the table these securities which his father had left there. You will appreciate the difficulties which might arise in that way: a man may have hallucinations of that sort, and think there are burglars about. I knew one who had such an impression and fired a revolver. Fortunately the "burglar" was a ghost, and no harm was done. These hallucinations are, not infrequently, most prominent at the waking moments. I saw an old lawyer who recognized that his ideas were wrong, but they were so dominating that he could not control them. I said to him, "What are your troubles?" He said, "To begin with, in the morning I wake up and—I can't help it—I spring out of bed because I see a dirty gypsy using my tooth-brush; yet I know there is no gypsy there, and I go back to bed again and reflect on what a fool I was." I asked him, "Does it occur at any other time?" He said, "Yes, after a nap; after I have been asleep a short time on coming from the office, before I dress for dinner, I wake up suddenly and see a gypsy pulling up my favorite shrubs. Again I know it is wrong, and yet I cannot control myself, for I feel inclined to rush out into the garden."

These hallucinations are the most marked, but there may be other hallucinations, but usually they are not so characteristic. It is interesting that in these decadent cases you may get a form of a disorder which may have occurred in the person's youth.

There are two or three things to learn from a study of these cases. One of these is one's own limitations. I often think of a time when I was on a moor in Scotland, and an elderly Scotch lady was present. I failed in something—golf, or shooting or fishing, and was rather sorry for myself, when she said, "You are old enough to have learned your limitations." This is one of the things we all have to learn, and not only our own limitations, but the normal limitations. There are lots of people who, though old, are very useful, many people whose age does not interfere with their capacities.

Another thing to bear in mind is that a person who has had energy enough to live till eighty years of age has probably a reserve of energy which can be called upon when required. I used to say—and still say—that as far as mental disorders are concerned, I would more hopefully treat a patient who had broken down for the first time at sixty than one who broke down at sixteen, because unless there is some special cause in the first case, a person who has lived long without an accident may be assumed to have some reserve which can be used towards recovery.

Lastly, we must all remember that a lot of the brightest, the best and most intelligent people die first at the top.

SOME NOTES ON ASEXUALIZATION ; WITH A REPORT OF EIGHTEEN CASES

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Asexualization is not a new subject. Indeed as practiced in many lands, in many forms, for thousands of years, it is almost as old as the world itself. In the Scriptures we find mention of it, notably in the Book of Job, and in some parts of the New Testament ; and it is often referred to in other ancient writings : the Histories of Assyria, China, Egypt, India, Persia, Rome and Greece speak of it again and again. It was practiced before the reign of Semiramis ; and Andramgtis, King of Lydia, sanctioned sterilization in both sexes.

At the festivals of the Phrygian Goddess Amma (Agdistis), the youth would operate upon themselves with sharpened shells ; and the Phœnicians had similar customs ; as did also the Aztec priests. Asexualization is still in practice among the inhabitants of Borneo, Java and Malaya ; while among the Hottentots, various tribes of the Philipinos and Australians (notably the Kalkadoons), and some American Indians, it is also to be noted.

A certain religious sect in Russia, known as the Skoptzies (the castrated), call themselves the "White Doves." In Roumania also a similar practice obtains "for the Kingdom of Heaven's Sake."

The idea is prevalent that eunuchism is associated with physical and mental decay ; but such is not the case. On the contrary from Herodotus we learn that in Persia eunuchs were highly esteemed for their wit, and intelligent use of strength and mentality.

History tells of many great men who were unsexed. The celebrated general of Justinian I, Narses, who defeated the Goths commanded by Totila and, having recovered Rome, was appointed Exarch of Italy, was a eunuch, and was most successful in his administration.

Hermias, the friend of Aristotle, was also noted, as an administrator, in the government of Assos and Atarneus in Mysia.

Bagoas, the Persian eunuch and soldier under Artaxerxes Ochus, was known as "The Maker of Kings."

It is a well-known fact that until discouraged by Pope Clement XIV, and absolutely forbidden by Pope Leo XIII, many choir boys were operated upon in order to retain the sweetness and strength of their soprano voices.

Goethe said: "Fools and sensible people are alike harmless. It is only the half-foolish and half-wise who are most dangerous." Surely this is a truism verified by the fact that the feeble-minded have so multiplied and increased as to become a distinct race, now beginning to be recognized as such; needing protection for themselves and the world from them. But what is not *fully recognized*, as yet, is the fact that mental defectives suffer not only from exaggerated sexual impulses; but from mental and moral debility, causing always a minimum of judgment and of will-power, leaving them greater slaves to the impulse of the moment, than are many normal children.

There is consequently little, if any, balance between the intellectual and moral faculties, and but a rudimentary idea of relative values, constituting inability to recognize or to resist coming ill; rendering them therefore mere creatures of the moment and slaves of temptation. Indeed they are so crooked that they are parallel to nothing, and one can hardly fathom how protean are the vagaries of mental defect.

That the quieting of nervous and exaggerated emotional excitation is a primary and necessary factor in developing and training mental defectives, experience has proven; it further points to asexualization as a powerful agent; a measure therefore contributing to the protection and advancement of the individual, either within or without institution walls.

Moreover this quieting of, or power of holding in abeyance, the sexual impulses, is the surest weapon for combating prostitution, providing thus a protection to society as well as to the irresponsible who, recognized or unrecognized, proves either seducer or victim.

"Race betterment," thus once secured, insures not only diminution of the defective, but also of the criminal ranks, now continually recruited from that class.

The jails, penitentiaries, almshouses and reformatories are filled with defectives, many of whom are allowed to return unprotected to life outside, where—as before stated, with the sexual impulses ever exaggerated—they reproduce their kind from 2 to 6 times more rapidly than do normal people.

Heredity being the primary factor in production, the natural

means of arrest is the removal of sexual desire in the unfit, and destruction of power to procreate.

A very conservative estimate places the number of mental defectives in the United States at between 300,000 and 400,000, while it is fairly computed that of these only 39,000 are cared for in institutions.

There are 51,000 avowed cases of feeble-minded in the state of New York, over 14,000 in Massachusetts, and in Pennsylvania the number has been estimated at 20,000.

It has been conjectured that over 50 per cent. of the prostitutes in the United States are feeble-minded.

We quarantine influenza, leprosy and venereal diseases and have laws governing the use of alcohol and of narcotics; and, while we have some laws for the *protection* of the feeble-minded, we have accomplished but little to stem the tide of degeneracy, and pollution of our normal population.

In 1892 the Training School at Elwyn demonstrated the benefit of asexualization by the sterilization of two patients. When in 1894 Dr. F. Hoyt Pilcher, of Winfield, Kansas, reported that he had operated upon a number of boys (58 cases) with gratifying results, a howl went up throughout the length and breadth of our land, the like of which was never heard before or since. The political papers censured him, and the medical journals, in the main, praised and upheld him.

Later, Dr. Everett Flood, in Massachusetts, operated upon 26 cases, with the result that sexual appetite disappeared absolutely in all but two, and in these was markedly reduced.

Necessity for the adoption of heroic measures has been found, in the experience of a large proportion of institutions, asylums and prisons, and is now being persistently urged by leaders in the work.

That mere sentimental prejudice is gradually succumbing to the promulgation of this prevention of "True Race Suicide" is shown in the action of the legislatures of some thirteen states legalizing the asexualization of imbeciles, criminals and rapists.

Pennsylvania, the first to demonstrate by operation the beneficial results attained by asexualization, was also the first to demand legislative authority in broadening the work. In this thrice have her efforts been defeated—each time suppressed by a single voice—the veto of two governors (1905–1909) and the influence of one legislator (1911).

In 1907 Indiana passed the first bill authorizing operations upon confirmed criminals, idiots, imbeciles and rapists in state institutions.

Some 800 were vasectomied; and of these 200 were operated upon at their own request.

California followed with a law to permit the asexualization of inmates of state hospitals for feeble-minded, and convicts in state institutions.

In 1909 Connecticut enacted a similar law, followed by New Jersey, Wisconsin and New Hampshire; the operations to be oöphorectomy in the females and castration, or vasectomy, in the males.

We must face the fact that the very life-blood of the nation is being poisoned by the rapid production of mental and moral defectives, and the only thing that will dam the flood of degeneracy and insure the survival of the fittest, is abrogation of all power to procreate.

The shibboleth of the day is "lock up all degenerates once so proven." And this we do. But sooner or later the brighter ones, whose defects for a time are masked by the benefits received from training, are removed from the protection of sequestration, either by parents or guardians convinced of "cure" so called; or again by the misdirected philanthropy of idle women; or *some* charitable societies, eager to set them at liberty "that they may have their chance." They have it all right! And pressing forward they go out to meet the "Years to Come," and tramp through the black morasses of sexual filth until precipitated into the whirlpool of the stormy "Sea of Life" from which few, if any, ever return: and double prisoners and captives of the vicious, and their own passions, they sink lower and lower, consorting with the ruck and filth, the skum and dregs of mankind. Then these hereditary irresponsibles—degenerates, imbeciles, defective delinquents and epileptics—the very nightmare of the human race, ever with sexual impulses exaggerated, find their "chance" in reproduction. Unconsciously innocent poisoners of a normal race, they are nevertheless its worst enemy.

In regard to the character of operations: Personally I prefer castration for the male, and oöphorectomy for the female, as insuring security beyond a peradventure; and when performed on the young, desire almost entirely ceases, or is at least held in reasonable abeyance.

If for sentimental reasons the removal of the organs are objected to, vasectomy or fellectomy may be substituted.

The cases of castration, vasectomy and oöphorectomy, taken at random from my notes, and herewith appended, may prove interesting verifications of results attained:

W. D. Moral imbecile of middle grade. Mother a low-grade imbecile, and a nymphomaniac; has had two illegitimate children; father of this boy unknown.

W., born with a heritage of poverty, was cared for through infancy and early childhood by various charitable societies. A rather pleasant-faced boy, with brown hair and rosy cheeks, there was yet a sly, furtive



FIG. 1.

expression in his eyes. Hands broad and always cold; he was awkward in their use, and when provoked would bite them. Was nervous, restless, mischievous and talkative; an intense egotist, was fond of making himself conspicuous, and would go to any length to attract attention by his swagger and assumption of dignity. With an affectionate disposition, he was also quarrelsome, vulgar, profane, absolutely untrustworthy, a thief and liar; and when detected would weep copiously, promise to do better, and promptly repeat the offence. Unclean and masturbating constantly, he proved a pernicious influence among other

boys. His perverted sexuality became alarming after passing his tenth year; he took the greatest delight in exhibiting his person to women, and pursuing strangers even on the public roads, would implore them to copulate with him. Discipline had no effect, and he became such a menace that when eleven and one half years old he was castrated.

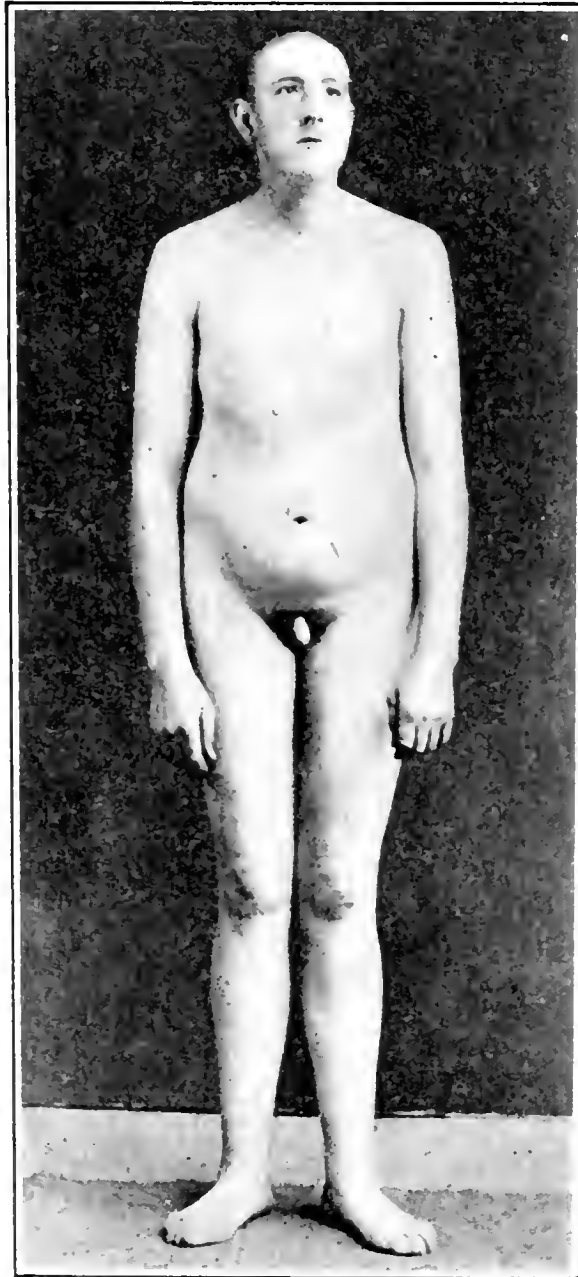


FIG. 2.

Within three hours after the operation he was crying to get up; which he did in five days; and was quite as well as ever. In a month he had become decidedly more tractable and docile and there was marked diminution in sexual desire, which was progressive and became in a few years *nil*. He brightened up mentally; and indeed there was marked

improvement in every way. With the phenomenal memory peculiar to the imbecile, he learned to read and write with comparative ease, responded to military exercises and hand-training, and became a fair shoemaker, and a very good, plain cook.

He also developed a clear, sweet, soprano voice, became very sentimental toward women, and had a platonic love affair constantly on the *tapis*. His breasts enlarged, he grew stout and tall—six feet—and the penis became very small—indeed almost infinitesimal.

When twenty-five years old he eloped with a large, healthy woman of a low grade of mentality, some ten years his senior, and married her—so it is said. He made a good living in a pottery factory for some time and is now working as a cook; and after thirteen years he and the woman are living together, apparently very happy. The full-length picture was taken when ten years old, the bust when sixteen and the nude when he was nineteen years of age.

A. C. Moral imbecile of low grade. Paternal grandmother a confirmed drunkard; maternal grandmother died of pulmonary tuberculosis and acute alcoholism; and paternal grandfather of cancer.

A maternal uncle and aunt committed suicide while insane. Father of boy insane; mother nervous and erratic, has had convulsions. Two brothers are feeble-minded, and another insane; has three feeble-minded cousins, one of whom is epileptic.

A.'s instincts were all bestial; no woman was safe at his hands. Language and actions were vile beyond description.

Was castrated when nineteen years old. There was marked improvement noticed within a month. Became gentle, tractable, and makes a good living as an aid in a hospital.

J. S. Moral imbecile of high grade. A seven-month's child. Father, mother and mother's brother all drunkards and feeble-minded.

Subject was vulgar, profane and of unspeakable habits, being a sexual pervert of the most pronounced description; and an egomaniac, took great delight in calling attention to his disgusting practices. Became so obnoxious that he was castrated in his seventeenth year.

Sexual impulses were immediately quieted, and his vulgarity lessened; although his egotism remained. He learned to read and write, and is now making a fair living as a farm hand and general utility man.

J. R. A moral imbecile of middle grade. Father and mother drunken mendicants, and mother feeble-minded as well; have three feeble-minded children, one of whom is epileptic.

Subject very profane, had an insane temper, was brutal in all his instincts, and dearly loving a fight—as he had no idea of the force of a blow—was very dangerous. Sexual impulses, although not so exaggerated as in some, were yet present.

Was castrated when twenty years old, and for the past eight years has given but little trouble; and none at all sexually. Has grown more

docile, and outbursts of temper are rare and not violent. Is an excellent aid in the engine room, really doing a man's work, and doing it well.

A. N. High-grade imbecile. Sexuality exaggerated; but the son of an extremely wealthy father he had been so surrounded by good influences and carefully guarded that he did not *fully* realize the signifi-



FIG. 3.

cance of impulses. Father fearing that there might be trouble in the future from blackmail, at the hands of unscrupulous people, had him castrated in his seventeenth year.

The boy had a most violent and uncontrollable temper, which immediately improved; became docile and made such mental strides that he was able to accept a clerkship in a store, where, engaged in work making

but little demand upon his reasoning powers, he has been kept busy, and consequently happy, for some fifteen years.

J. T. Moral imbecile of middle grade. Mother feeble-minded; had four still-born children. Father, a miner, is dead; cause unknown. Boy a sexual pervert; vulgar, profane and abusive. Had attacks of sexual excitement, occurring periodically, during which he became uncontrollable and very difficult to manage. These increasing in force and frequency, he was castrated in his nineteenth year. Since the operation there has been marked improvement. Is gentle and tractable, sexual irregularities have ceased, and is much interested in sewing, painting and embroidery, all of which he does well.

G. W. Moral imbecile of middle grade, with intercurrent insanity. Father's sister has two feeble-minded children.

Boy an epileptic, was an adroit thief, an accomplished liar, and obstinate, passionate and cruel; would bite companions without provocation. At times melancholy and suicidal; once attempted to cut his own throat

Was vasectomied when seventeen years old. Improvement so marked that he was able to secure work and has made good for four years.

C. D. High-grade imbecile with intercurrent insanity. Father and mother both died insane, and has a sister who is feeble-minded.

Vasectomied when nineteen years old at own request; as he realized that he was sexually exaggerated. Immediate improvement was noticed. Responding to training he in three years became an excellent tailor, and, learning to play on the barytone, he was a valuable addition to the institution band.

Later he enlisted in the Army as a musician, and gave satisfactory service in the band; and ordered to France he was wounded, but recovered. He is doing fairly well after six years.

H. F. Moral imbecile of high grade. Father a nurse in an almshouse, is described as "a bad old man"; mother a feeble-minded epileptic; has another son and daughter, both feeble-minded. All children are illegitimate and by different fathers.

This boy, untruthful and a most adroit thief, was a pronounced case of perverted sexuality.

Vasectomy having been performed at the age of twenty, immediate improvement, both mental and moral, was noticed; improvement so marked that he secured a position as farmer's helper, and made good to such a degree that he was legally adopted by him and later married a respectable young woman. He continues to make a humble, but respectable living.

R. C. Moral imbecile of high grade—an octoroon. Father in prison for murder.

Was profane, vulgar, an adroit thief, and a sexual pervert. Learned to play well on trombone; and, although lazy, would work when forced.

Was operated upon in twenty-fifth year—vasectomied. Marked improvement noted and is now working in a mill, and so far has made good.

H. F. Moral imbecile of high grade. An accomplished liar; and thieving with him had developed into an art. Sexually exaggerated.

Was operated on—vasectomied—at own request in twentieth year. Marked improvement was noticed at once.

Secured positions as attendant in various hospitals, and made good for five years. Finally died of pulmonary tuberculosis.

E. W. Moral imbecile of middle grade. The much-indulged only child of wealthy parents, was uncontrollable at home. Ran up enormous bills for articles he did not want and had no use for. Talked constantly of sexual matters, and was simply wild on the subject of women; habits were very bad.

After many things were tried in vain, he was vasectomied in his nineteenth year, and while he improved in some ways after six years, the operation could not be called a *perfect* success, as occasionally he will have outbreaks of reckless spending, and sexual excitement. He is, however, much more controllable than he was, and retention in the home is possible.

E. B. Moral imbecile of high grade. A nymphomaniac. Father died of pulmonary tuberculosis; mother is a lethargic, weak woman, erratic and nervous. Mother's first cousin is an epileptic, and father's aunt insane.

Subject was vulgar, sexually exaggerated, untruthful, a thief and absolutely unreliable; yet has attractive manners and is rather good looking.

Oöphorectomy was performed in her sixteenth year, and for five years steady improvement was noted; indeed she improved to such a degree that she is now out in the world and a great assistance to her mother.

L. W. Moral imbecile of low grade, with intercurrent insanity. But little is known of parents. Has a feeble-minded sister. Vulgar, profane and addicted to bad habits, she was seduced when twelve years old.

Was operated upon in her twentieth year—oöphorectomed—with excellent results; seems to have lost sexual appetite, and with vulgarity and profanity less pronounced, she, in five years has become an excellent and reliable worker.

K. M. Middle-grade imbecile. Mother a low-grade imbecile. Father unknown. Child placed in an orphan asylum at very tender age. Had a pleasing personality, learned to read and write with great difficulty; was noisy, passionate dishonest, destructive, heedless of danger, dangerous with fire, a nymphomaniac and morally perverted. She became pregnant in her sixteenth year, a visiting workman being the author of her trouble.

Oöphorectomy was performed in her twenty-first year, followed by

mental and moral improvement. She became quiet, docile and a good worker in laundry and dining-room, and is now making a good living as a servant.

H. F. Moral imbecile of high grade. An illegitimate child; untruthful, untrustworthy, vulgar, profane, passionate. Had all the elements and characteristics of a prostitute. Mind was filthy. Loved to dress in cheap finery, and to exhibit herself to the opposite sex. Gratitude and appreciation were left out of her composition.

In her twenty-fifth year oöphorectomy was performed. There was immediate improvement in language and behavior; but improvement was not as well marked as in some cases.

Did well as a worker in a bacteriological laboratory; and later as a clerk in a store, and as a singer in a moving picture theater.

A. W. Moral imbecile of middle grade. Father's brother insane; father died of pulmonary tuberculosis. Extremely nervous and sexually exaggerated, her one thought was of sexual subjects; and she would go to any length to gratify her passion.

Was operated upon when twenty-two years old—oöphorectomed—since which (in ten years) there has been marked improvement.

With her sexual impulses lessened, she has become less nervous, and devoting her spare hours to quiet reading and occupations has learned to do very beautiful fancy work.

C. W. Moral imbecile of high grade. Father a minister, a dreamer and thoroughly unpractical. Mother's cousin insane.

Subject can read and write, and in some ways is very intelligent; but has a violent temper, dangerous to others during paroxysms, was sexually exaggerated, persistently unclean, and delighted to play in excrement and urine.

Oöphorectomy was performed in her seventeenth year, and although not immediately successful, there has in four years been progressive amelioration in all the above named habits.

ASCENDING COMPRESSION MYELITIS, ASSOCIATED WITH UNUSUAL PATHOLOGY

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On July 27, 1919, patient O. P., a sergeant of an infantry regiment, was admitted to the orthopedic service of Evacuation Hospital 27, with a diagnosis of "strained back." He stated that he had fallen backward while taking exercises, two days before his admission. His back struck the ground heavily at the time of the accident, which appeared to have been caused by his feet slipping upon the grass. Immediately afterward, he felt pain in his left thigh, which later "spread up over his back." He was able to walk after the occurrence, but did so "somewhat stiffly."

There was also a history of having been wounded in the left side of the chest, over a year ago.

Within a few hours after his admission to the hospital, his left leg became paralyzed, and the following day, also the right leg. There was retention of urine and feces.

He was first seen in consultation during the afternoon of July 28, at which time neurological examination disclosed the following:

There was an area of anesthesia over the left upper abdomen, corresponding to the level of the ninth spinal thoracic nerve root. Diminished sensation and scattered areas of anesthesia were present over the right abdomen, and extending down the entire right lower extremity; the most complete anesthesia was over the right thigh. Sensation over the genital area was normal. There was complete flaccid paralysis of both lower extremities. The reflexes in the upper extremities were all present and normal. The abdominal reflexes were absent on both sides, while the cremasteric reflexes were present and extremely active on both right and left. Knee-jerks and ankle-jerks were absent on both sides. On both right, and left, the

plantar response was slight flexion. At the time of this examination the patient was complaining of violent paroxysmal pains in his chest, unrelated to respiration, and on both sides, just above the level of the anesthesia. (See Chart No. 1.) There was pain, upon pressure, over the spines of the eighth and ninth thoracic vertebræ.

On July 29, he was noted by Captain Lowry, medical consultant, as showing signs of acute pleurisy on the right side. Lumbar puncture was performed on this date and the spinal fluid reported as having the appearance characteristic of cord compression; 125 red cells and 9 lymphocytes per cmm.; Wasserman reaction, negative. A second specimen, July 30, gave only 10 red cells, globulin slightly increased, Wasserman reaction and colloidal gold test, negative. A blood count showed 17,000 white blood cells, of which 72 per cent. were polynuclear, and 28 per cent. lymphocytes.

X-ray showed no evidence of spinal lesion.

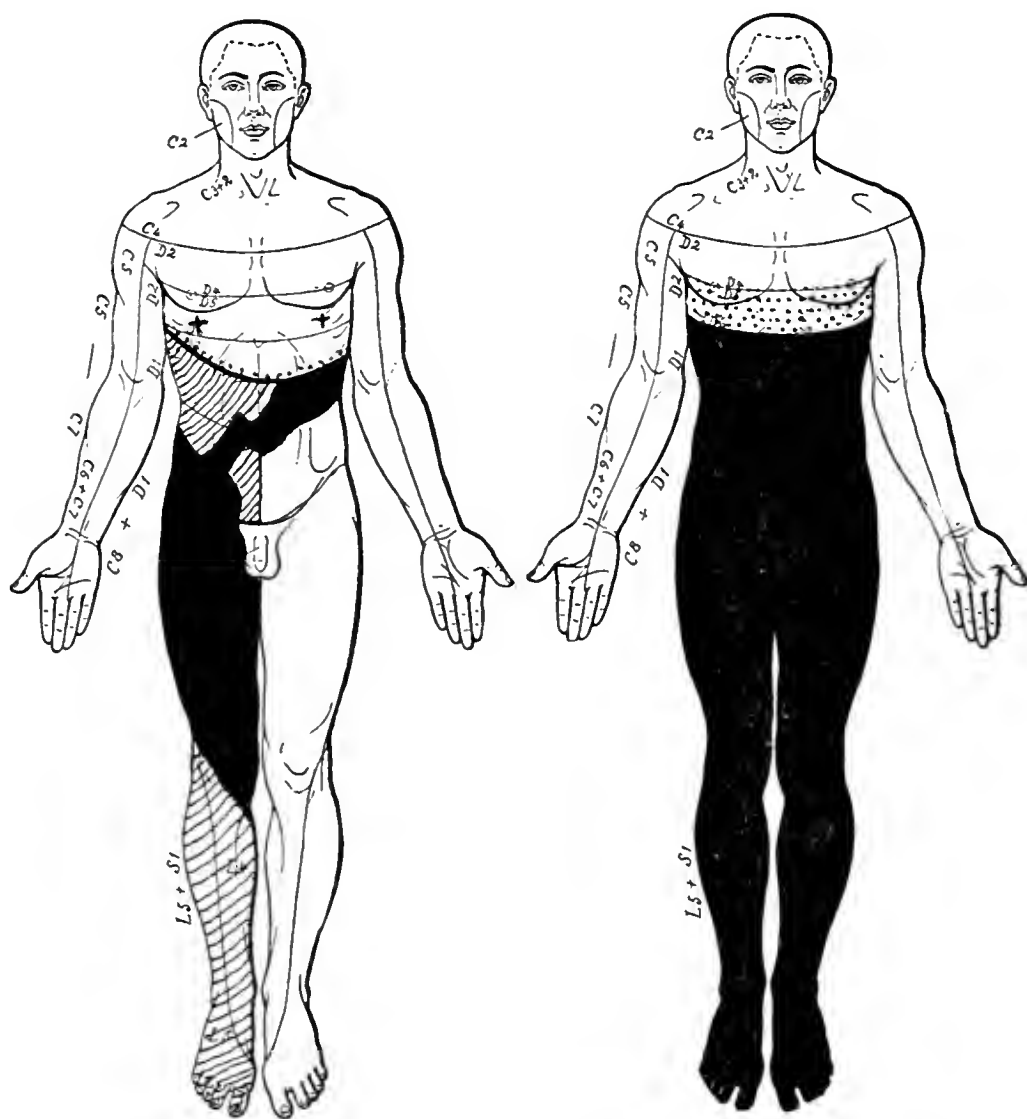
Neurological examination on July 30 showed total anesthesia to touch, pain and temperature on both sides of the body, including the genital region, everywhere below a line which corresponded roughly to that of the upper limit of the area of the seventh spinal thoracic nerve roots. Above this area there was a region of hyperesthesia, corresponding to the level of the fifth and sixth thoracic root segments. There was complete flaccid paralysis of all muscles from his waist downward. Reflexes in the upper extremities were slightly increased. The abdominal reflexes, knee-jerks, and ankle-jerks were absent on both sides, but the cremasterics remained present, although less active than formerly. In testing the plantar reflex, there was first slight flexion; then extension, and sudden spasmodic contraction of only an instant's duration, of all of the muscles of the thigh. This was observed on both sides. Kernig's sign was not definite, but spinal irritation appeared evident. The patient was at this time complaining of severe pain in the left shoulder and left chest. (See Chart No. 2.)

The clinical interpretation of the neurological findings was not easy. An organic disorder of the spinal cord had been definitely demonstrated, and this disorder had made its appearance following a slight accident. It was considered that the location of the original lesion was probably in the region of the spinal segment of the ninth thoracic root, and that there was evidence in favor of its having involved, first, the left side of the cord.

Paraplegia, arising after an interval of forty-eight hours or less, if unaccompanied by a rise of temperature, would suggest extradural hemorrhage. There was no record of fever prior to his admission,

but after his first day in the hospital, there was some irregular elevation of from 1 to 3 degrees F.

The question of operation caused considerable discussion; although favored by the neurological service, the negative X-ray seemed to surgical consultants to discourage interference. While



I

First Examination

July 28, 1919

Heavy black = anesthesia

Shaded = hypoesthesia

+, area of sharp violent paroxysmal pains

2

Second Examination

July 30, 1919

Heavy black = anesthesia to touch, pain and temperature

Dotted = hyperesthesia

neurological examination could localize the original lesion anatomically, it could not, of course, establish with exactitude, its pathological nature.

Soon afterward, the patient developed a septic temperature, with

the signs of ascending myelitis, and died on August 4, 1919, of respiratory paralysis, showing prior to his death an axillary temperature of 108° F.

At autopsy, the right pleural cavity contained a moderate amount of clear yellow fluid; the left a moderate amount of cloudy, reddish fluid, and was blocked off by extensive adhesions. The lower lobe of the left lung was covered by a dense yellowish, slightly adherent membrane. A small area of the lower lobe was dark red and sank in water; no air could be expressed from this portion. Otherwise, the lungs were crepitant throughout.

The dura covering the brain showed nothing of note, but there was a small amount of slightly cloudy fluid beneath it, and the pia was injected throughout.

The brain weighed 1,505 gms., and was slightly softened, focal areas sinking below the level of the gray, on cut sections. The floor of the fourth ventricle was smooth, the choroid plexus reddish purple in color.

Upon opening the spinal canal, there was a large amount of thick, yellow, creamy pus between the dura and the canal wall. The pia was injected throughout, and the cord on section bulged over the cut edge. Before cutting, the cord felt solid with the exception of the lumbar region, which was very soft. There was a communication between the vertebral canal and the thoracic cavity upon the left side, between the ribs, and on a level with the superior margin of the eighth thoracic vertebra. The surrounding tissues were soft and spongy.

The localization at the level of the ninth thoracic nerve root appears to have been reasonably accurate, as the ninth root ascends past this area to join the cord on a level with the sixth thoracic spine, and the pressure of exuding pus in this area appears to have given rise to the signs referable to the left side of the cord, which were observed at the first examination. Just what relationship his fall bore to the rupture is not exactly known. Possibly the trauma was the final factor in causing the pus to break through. There was no question but that there was an old pleurisy, on which was superimposed an acute process. The former may have been due to his old wound.

The case is considered remarkable, in that a man who appeared to be in quite good health should sustain an injury so slight, and develop a compression myelitis which resulted in his death and which

was associated with such unusual pathology, *i.e.*, fibrino-purulent pleurisy with extension extradurally, into the vertebral canal.

The writers desire to express their thanks to Col. R. W. Kerr, M.C., the commanding officer of Evacuation Hospital 27, and to Capt. Chas. C. Dickey, M.C., chief of orthopedic service, for the facilities extended to them in the study of this case.

CONTRIBUTION TO THE STUDY OF CEREBELLAR LOCALIZATIONS¹

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OF PHILADELPHIA

As far back as 1876 Nothnagel² advanced the view that the vermis and cerebellar hemispheres possess different functions. Since then a number of physiologists have corroborated Nothnagel's contention by observing that destruction of the vermis was followed by symptoms different from those occurring in destruction of the hemispheres. At present it seems to be pretty well established from the anatomical researches of Bolk³ and of Edinger,⁴ also from the experimental investigations of Adamkiewitz,⁵ Rothmann,⁶ André-Thomas⁷ and others that the lower and upper extremities have special centers in the cerebellar hemispheres on the same side; the head, neck and trunk have special centers in the vermis. Further investigations have shown that the vermis or paleocerebellum of Edinger is in a physiological relation particularly with spinal and bulbo-pontine centers, while the cerebellar hemispheres are in relation with the cortex and central ganglia of the cerebrum. Moreover, the vermis by virtue of its intimate relation with the nuclei of the vestibular nerve is concerned in the regulation of coördinated movements, such as for example, equilibrium of the body, while the hemispheres are concerned in voluntary movements. The influence of the cerebellum consequently is being carried on either through a reflex path, viz., the nuclei of the vestibular nerve and red nucleus, or by means of the cerebrum through the superior cerebellar peduncles and thalamo-cortical fibers.

A more detailed analysis of the observations concerning the function of the cerebellum leads, first of all to the views of Luciani,⁸

¹ Read at the meeting of the American Neurological Association in Atlantic City, June 16-19, 1919.

² *Centralblatt für die medicinische Wissenschaften*.

³ *Das Cerebellum der Säugethiere*, 1906.

⁴ *Centralbl. f. die gesamte wissensch. Anatomie*, XXXV, 1909, Nos. 13 and 14.

⁵ *Neurol. Centralbl.*, No. 12, 1904, and No. 15, 1907.

⁶ *Berl. klin. Wensh.*, 24 Feb., 1913.

⁷ *Revue Neurol.*, 1913, 10 Juillet.

⁸ *Il Cerveletto*. Firenze, 1891.

supported by Bolk. According to the first, the influence of the cerebellum is four-fold, namely, *sthenic*, *tonic static*, also *adjusting*. The latter controls measure, precision and adaptation to voluntary automatic and reflex acts. While such a view has the pretension to consider the cerebellum as a homogeneous mass, nevertheless in it one sees the beginning of cerebellar localizations. Luciani himself admits that the above functions have reference to a special distribution in the cerebellum, namely, that each half of the body corresponds to the same side of the cerebellum. Accepting Luciani's idea concerning the general functions of the cerebellum, Bolk takes a further step and attempts to find a relationship between certain muscular groups and certain cerebellar areas. Bolk's work is therefore the first firm step towards the study of cerebellar localizations.

In the execution of bodily movements a simultaneous display of the muscles of the right and left sides are sometimes indispensable, such as movements of the head and neck, and of their individual parts, namely, eyes, speech, mimicry, mastication, larynx and pharynx. In other cases the most complicated movements are executed by the musculature of one side without participation of the other side. Moreover, the extremities may execute acts in which various movements are in coördinated relations to each other, also, acts in which one limb independently of others may carry out movements of a diverse character.

Bolk and other physiologists reached the conclusion that muscular groups of the limbs possess two centers in the cerebellum: one, single or median, which controls synergic movements; the other, double or bilateral, which controls unilateral movements. From his studies of comparative morphology Bolk drew up the following distribution of cerebellar centers corresponding to synergic and unilateral movements of various muscular groups. First of all, he divides the cerebellum into two portions: anterior and posterior lobes. The latter is divided into an anterior or simplex and posterior portions. The posterior portion contains a median single lobule and two lateral lobules. The anterior lobe contains centers of coördination for the muscular groups of all parts of the head. The simplex portion controls the muscles of the neck. The median lobule of the posterior portion of the posterior lobe controls the synergic movements of the right and left limbs through its upper portion and the movements of the trunk through its lower portion.

Finally, the lateral lobes are centers for unilateral movements of the extremities. The cerebellum therefore is a combination of various differentiated centers which serve for various muscular adaptations.

The knowledge of cerebellar functions and localizations was placed on a solid basis since experimental work was undertaken. The work of Ferrier (1878), carried out by electrization and destruction of various portions of the cerebellum, have shown that each side of the cerebellum coördinates the muscular mechanism, that the middle lobe has a different function for its anterior portion from that of its posterior portion. Adamkiewicz's experiments on rabbits (*loc. cit.*) lead to the view that the cerebellum participates in all movements of the body with the aid of the controlling influence of the cerebrum and that it contains a special center for each group of muscles. Van Rynberk⁹ from his experiments on dogs found that destruction of the simplex lobule (Bolk's classification) is followed by astasia of the head, while destruction of certain portions of the lateral lobes leads to weakness and dysmetria of the extremities. Rothmann (*loc. cit.*) has shown still more precisely that injury to the lateral lobes causes the animal to throw the fore or hind legs outward while walking or resting, and the limb is in flexion. A lesion of the vermis produces different symptoms according to whether the destruction is in the anterior or posterior portion. In the first case he observed astasia of the head associated with disturbances in the coördination of the extremities and curvature of the trunk. Moreover, when the most anterior portion of the anterior lobe is damaged, laryngeal manifestations are observed, viz., the vocal cords are in abduction and animated with fibrillary tremor, the glottis remains patent. The muscles of the jaws and the tongue show fibrillary contractions. When the posterior portion of the vermis is damaged, there is atony of all the limbs and of the muscles of the trunk. Extirpation of the lateral portion of the quadrangular lobe causes loss of ability of correcting a passively displaced limb outward and forward. If on the contrary the median portion of the quadrangular lobe is destroyed, the ability of correcting a displaced limb inward, forward or backward, is lost.

André-Thomas,¹⁰ in collaboration with Durupt,¹⁰ performed a very large number of experiments on higher animals by method of extirpation. He corroborated largely the results obtained by other investigators. He has shown that when extensive lesions are produced, the symptoms will be observed in a whole limb, but when the lesion is limited, the disturbances will be observed in certain parts of the limb. Otherwise speaking, primary centers in the cerebellum are divisible into a certain number of secondary centers which con-

⁹ *Folia neurobiologica*, 1912, Band VI.

¹⁰ *Revue Neurol.*, 1912, 1913.

trol certain segments of the limb, or certain groups of muscles, so that the diverse functions of the muscles are thus under control of special portions of the cerebellum. Flexion, extension, abduction, rotation, etc., are all the results of function of special centers which could be called "centers of direction."

The general consensus of view as inferred from the experimental observations leads to the conclusion that disturbances of statics and equilibrium are associated with lesions of the median lobe, while in lesions of the lateral lobe dysmetria of the limbs is the most conspicuous motor manifestation. The great symptom-group characteristic of cerebellar diseases as observed in man, the so-called cerebellar syndrome, has been observed during the experimental investigations on higher animals when isolated portions of the cerebellar lobes had been either damaged or stimulated. Hyposthenia, hypersthenia, disturbance of equilibrium, dysmetria, adiadokokinesia, disturbance in the position of the head and in the attitude of limbs, variation in orientation, ataxia, disturbance of muscular sense, tremor, finally alteration of the directing and adjusting power—are the manifestations observed in both experimental physiology and diseases conditions. In the latter case the pathological element is rarely so small as to involve only a very limited portion of the cerebellum and produce phenomena identical with those obtained in experimental work where the operator can attack at will any portion of the organ. In the largest majority of cases a lesion encroaches in several directions and invades simultaneously various neighboring areas so that to give place to a variety of symptoms characteristic of several cerebellar centers. Occasionally, however, we meet with cases in which the localized arrangement of the lesion is such that the clinical cerebellar manifestations are closely analogous to those observed in experimentation on higher animals by extirpation or stimulation of selected cortical areas, thus reinforcing the contention concerning the existence of special primary and secondary centers in the cerebellum. Four such cases presented themselves for study in which prolonged observation and detailed analysis of symptoms during life offered certain deductions instructive from the standpoint of localization.

CASE I. Girl of 27 complained of severe headache and occasional vomiting for several months. At the time of the examination she presented the following symptoms. The legs were somewhat rigid and held separated from each other while she was walking. The patient seemed to have some difficulty in detaching the feet from the floor. The gait was slow and hesitating, there was distinct titubation. The

trunk showed frequently a tendency to lag behind while the legs advanced. There was no paralysis. The knee-jerks were increased and ankle-clonus was distinct on the right side. There was a manifest dysmetria in the lower and upper extremities with *adiadokokinesia*, all more marked on the right than on the left side. The right arm presented an intention tremor. The eyes showed papilloedema more marked on the right than on the left side. Nystagmus was present in lateral movements of the eyes. The most interesting phenomena were the following: When the patient attempted to leave the bed and stand up, there was a tendency to fall backwards. When she was not supported and the upper part of the body would make a backward movement, the legs would follow the latter. Otherwise speaking there was retropulsion with a slight inclination towards the right. The tendency to fall backwards was quite constant. Even while in a sitting position, the trunk would frequently be drawn back and the patient would invariably correct this position.

The backward movement of the head, neck and trunk which was so strikingly constant whenever the patient assumed an erect position in walking or sitting reminds of the above described experimentation on animals by excision or electrical stimulation of the vermis. The vermis is being considered as the center of the upper central part of the body. The presumption therefore in the case of the girl was that she was suffering from a neoplasm in the cerebellum situated in the median line with predominance of pressure more on the right than on the left hemisphere. The participation of the left hemisphere found its further corroboration in the pointing test: The patient is told to observe the position of an object placed before her. After closing her eyes she was asked to raise her arm and then slowly to place the index finger of each hand successively on the upper end of the object. The movement of the left index was invariably correct while the right index at no time reached the object and was always found on the inner side of the latter. The "resistance" test of Holmes and Steward gave the following results. The patient was told to flex energetically her right arm while an effort was made with my hand to prevent this flexion. When my hand was suddenly withdrawn the movement of flexion continued and the patient's forearm struck her chest with violence, showing a delay in the movement of the antagonistic muscles. In the same experiment with the patient's left arm there was at first a continuation of flexion for a few moments, but the arm immediately stopped and then moved in the opposite direction, namely, in the extension. It was evident that the pathological condition in the present case involved simultaneously the vermis and

the cortical center of the right upper extremity in its most median portion. Subsequent events verified largely this assumption. Autopsy revealed a soft mass pressing directly on the lower surface of the anterior portions of the median lobe extending laterally, so

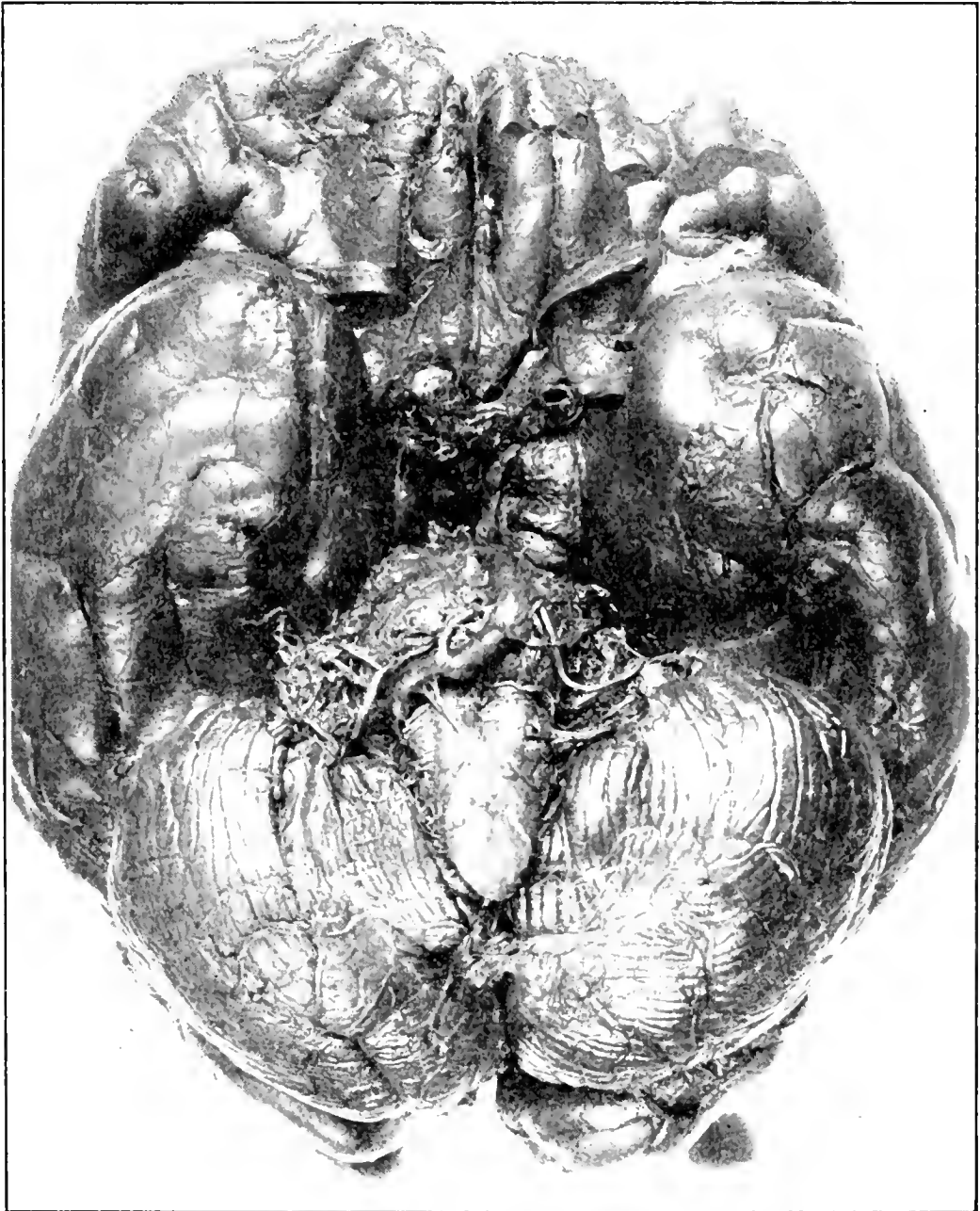


FIG. 1.

that to compress the anterior portions of both cerebellar hemispheres, but decidedly more so on the right than on the left side (Fig. 1).

CASE II. Boy of 13 presented an array of symptoms indicative of intracranial hypertension, viz., severe headache, projectile vomiting, in-

somnia and vertigo. Papilloedema was also present. The following objective phenomena were observed. The patient had great difficulty in standing on his right foot. While walking he moved towards the right. The right arm presented some dysmetria. There was no adiadoko-

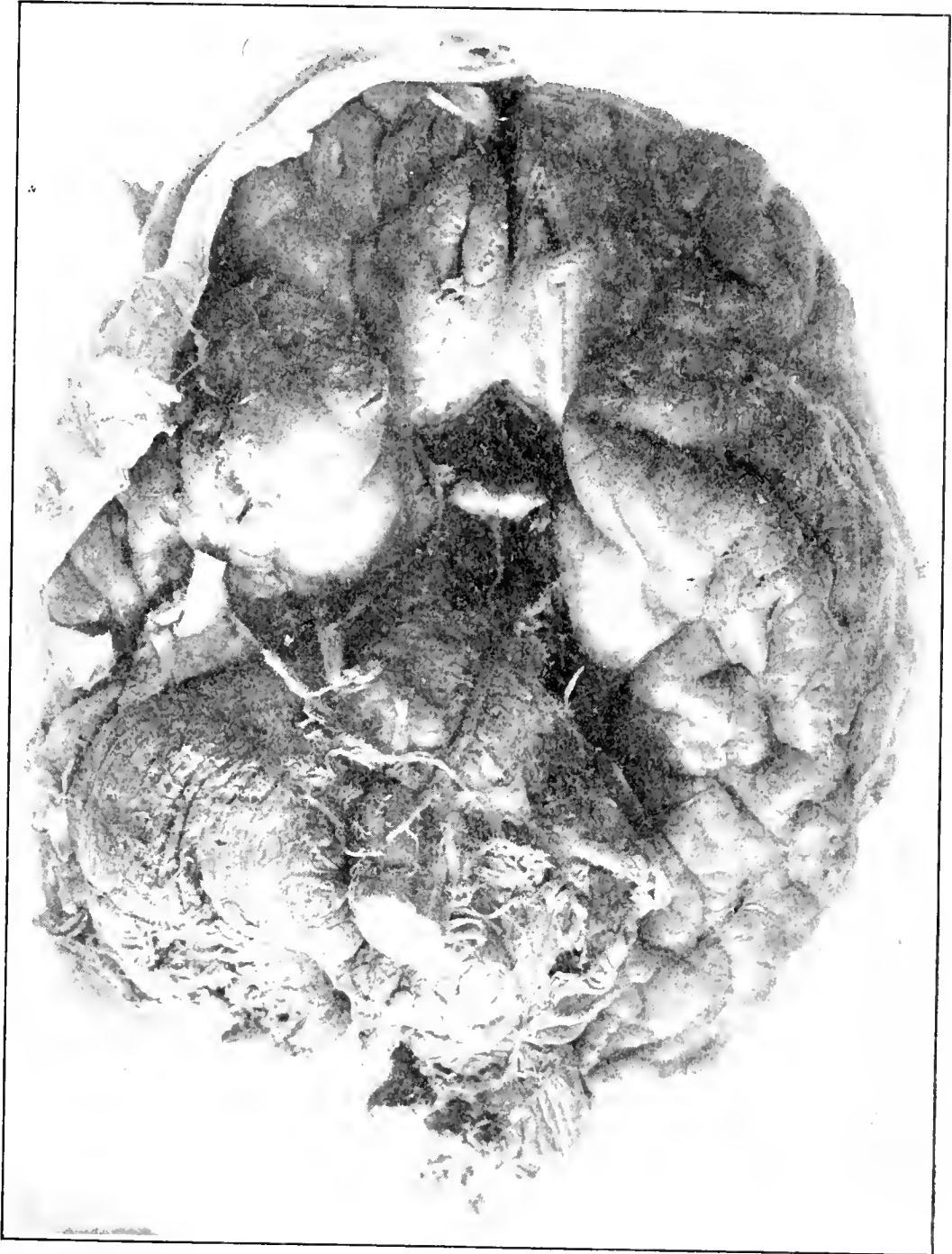


FIG. 2.

kinesia. The most striking phenomena were those concerning passive movements of the right arm and hand. When the limb was placed in an awkward position, for example in extreme extension or in adduction, it remained in the abnormal position for a long while without any

special discomfort to the patient; when the opposite limb was placed in identical position, it would rapidly correct the position. Extension and adduction were the main attitudes which presented the above abnormality. Curiously enough extension and adduction were the only movements which were especially affected in the above mentioned dysmetria. When the patient was told to extend his arm, the latter would make several movements to the right, left, above and below before it would become fully extended. The same difficulty was experienced in the adduction movement. It was evident that passive and active movements were defective for certain groups of muscles. It was also evident that we dealt here with a hyperactivity of certain groups of muscles which tend to act in an abnormal direction and with a want or diminution of resistance of the antagonistic muscles. Moreover there was no tendency on the patient's part to correct the irregular movements. The entire symptom-group in this case pointed to an involvement of a certain limited portion of the cerebellum the function of which consisted of controlling certain movements of one limb, otherwise speaking certain muscular groups. At autopsy a mass was found invading the very anterior portion of right hemisphere in its middle third. (Fig. II.)

CASE III. A man 39, presented besides headache, vertigo and frequent vomiting the following symptoms: Hypesthesia of the left side of the face; paresis of the external rectus of the left eye; marked diminution of the left patellar tendon reflex and a tendency to walk towards the left side. There was also a marked dysmetria in the left lower limb which was manifested in the following movements. In attempts to advance during the act of walking the left leg would become overextended and the foot would be placed on the ground. The latter remained a good while in the same position before it would be raised off the ground to flex for a further step. There was not a real hesitancy but an actual delay in the movement of projection of the leg; also an exaggeration of the extension movement. In other words in the successive movements of extension and flexion during the act of walking there is at the same time an exaggeration of the activity of the muscles which execute the movements, and a delay in the activity of the muscles which must functionate immediately after the first. In the left upper extremity there was some dysmetria but by far less pronounced than that of the lower extremity just described. The condition of the latter points strongly to an involvement of certain small portions of the cerebellum which control chiefly the lower limb and especially certain muscular groups of the leg. Autopsy revealed a ponto-cerebellar tumor on the left side compressing the lateral anterior portion of the left cerebellar hemisphere. (Fig. III.)

CASE IV. Boy of 17 presented all the evidences of intracranial hypertension, viz., intense headache, vertigo, vomiting and papilloedema with total blindness. Upon examination for localized symptoms the

following phenomena were observed. Hypoesthesia of the left side of the face, diminution of acuity of vision on the same side. Inability to stand on the left foot. Titubation was pronounced with a tendency to fall towards the left. Marked diminution of the left knee-jerk. The left arm presented this peculiarity that all its movements were carried out correctly with the exception of one. When he was asked to rotate the arm inwards and outwards, a distinct dysmetria was observed. In attempting to rotate the arm the patient made all sorts of awkward mo-

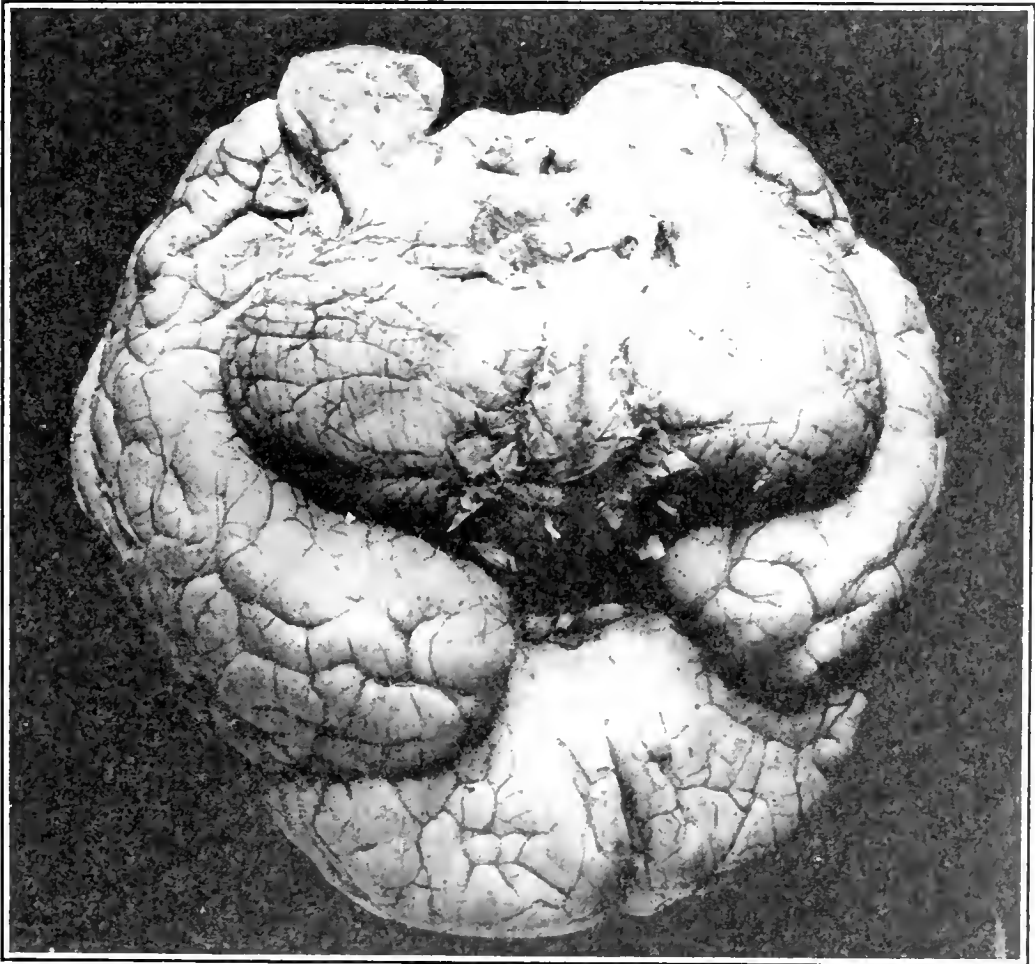


FIG. 3.

tions with other muscles, except the rotators: for a good while would he elevate the shoulder, extend, flex, bend, the arm before he was able to rotate it in either direction. Moreover, once the arm rotated, he apparently had difficulty in changing the position: here again he would perform various movements before the desired act was accomplished. This delay in correcting the position of the arm was evidently due to a weakness (hyposthenia) of the antagonistic muscle groups. It was present not only in active but also in passive movements: when the arm was placed in a rotated attitude (inward or outward), the patient made the above mentioned abnormal effort to overcome it. It was manifest

that a certain cortical portion of the cerebellum which probably controls the function of rotating the left arm was here involved. In other words the groups of muscles which serve rotation of the limb are no more under the influence of their cerebellar center. Autopsy showed a small mass lying in the left ponto-cerebellar angle pressing upon the inner and upper portion of the cerebellar cortex. (Fig. IV.)

To sum up, we are here in presence of special motor manifestations, viz., retropulsion of the upper part of the body and pointing

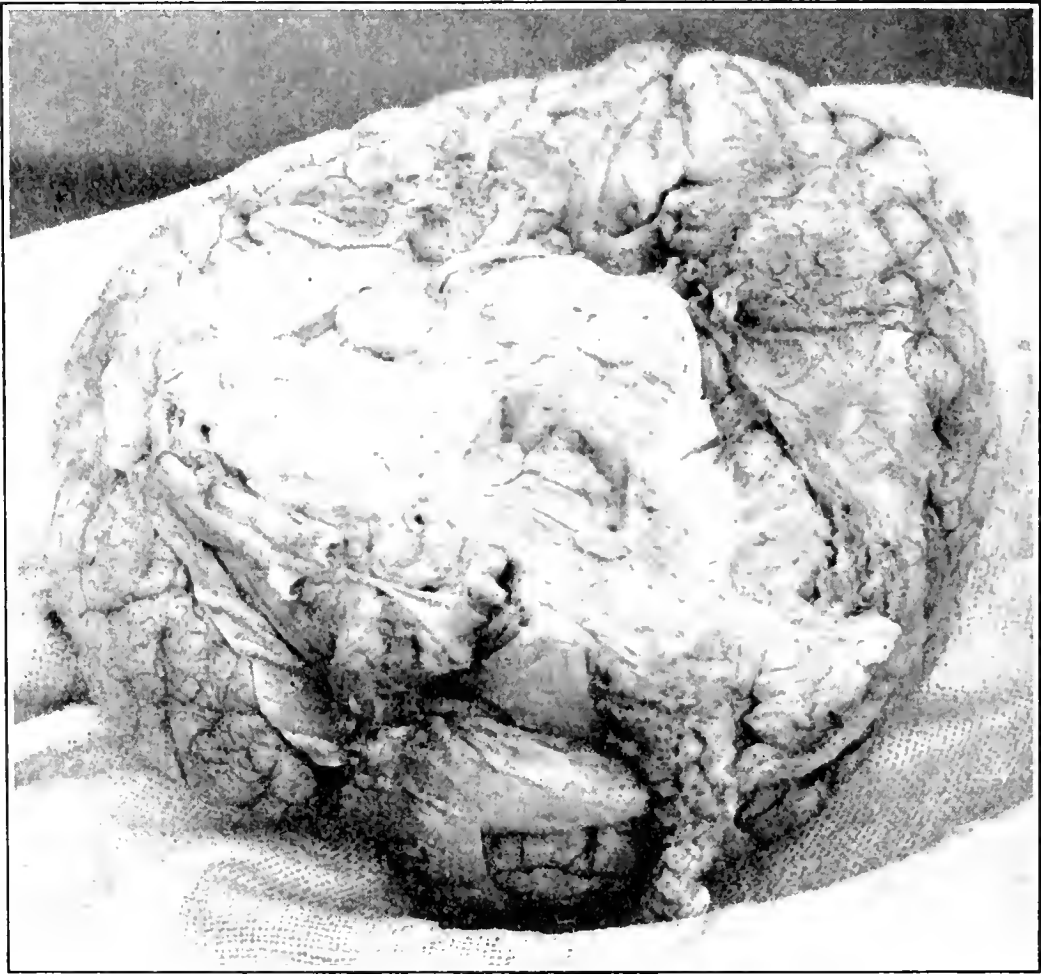


FIG. 4.

in inward direction—in the first case, abnormal activity or hypersthenia in two movements, namely, adduction and extension during active or passive states in the second case; abnormal extension and flexion of a limb in the third case; finally abnormal rotatory movements in one limb, also delay in correcting a wrong position of the same limb in the last case. An analysis of these four cases shows with considerable evidence that certain special movements, or rather the function of certain muscular groups is affected in diseases of

the cerebellum. Moreover, the fact that among a great variety of activities only one or two should be involved while all others remain intact, is a direct indication firstly, that the cerebellum possesses distinct centers for the extremities and for the head and trunk; secondly, that these primary centers are composed of secondary centers having under their control segments of limbs through the muscular groups of the latter; that the individual muscle groups may be affected in their respective function, such as adduction, abduction, rotation, flexion, extension, etc. The resultant abnormal function may be hyposthenic or hypersthenic. In other words, the individual secondary centers have under their control the stability and orientation of the parts over which they have control. Consequently dysmetria, adiadokokinsia and many other motor disturbances of a delicate character are intimately associated with the individual segmentary disturbances of the limb, the cerebellar center of which is affected. The clinical findings in these cases are also in accord with the original Bolk's conception and the findings in experimental physiology, namely, that the cerebellar centers for the upper and lower extremities are located in the hemispheres on the homolateral side; that the head, neck and trunk are under the influence of the vermis.

On the other hand, however, the same cases prove the untenability of views which are too exclusive. In every one of the cases the anatomical lesion is rarely, if ever, confined to such a small area of cerebellar tissue that exact and well-defined inferences can be drawn with regard to isolated cerebellar centers corresponding strictly to a given muscle or a muscular group. Clinically, we observe a complexity of symptoms and anatomically we find lesions involving several portions of nervous tissue. Moreover, each experimental investigator has had great difficulty to limit excision or else electrical stimulation of cerebellar tissue to such precise areas as to enable him to draw extremely accurate conclusions concerning the function of these areas. Neither Van Rynberk's, Rothmann's or André-Thomas, careful experiments nor Bolk's morphological studies permit precise deductions. The same may be said of Bárány's interesting observations concerning the principal centers of direction upwards, downwards, externally and internally which he attempted to locate in some special parts of the semilunar lobes and digastric lobe. Authors accept with considerable caution the conclusion of Bárány and of experimental workers precisely because of their exclusiveness. A review of the data accumulated, clinical, anatomical and experimental, leads to this incontrovertible conclu-

sion that the cerebellum possesses centers for the limbs and segments of limbs and that suppression or irritation of these centers leads to a functional disturbance in a special given direction, which is manifested in abnormal activity of a certain group of muscles and in an exaggerated activity of other muscles which are correspondingly antagonistic to the former.

1812 SPRUCE ST., PHILADELPHIA.

Society Proceedings

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING, NOVEMBER 20, 1919

The President, DR. G. A. WATERMAN, in the Chair

THERAPEUTICS OF DECREASED INHIBITION

DR. JOHN BRYANT discussed a group of patients who were what he called inhibited. They developed chronic exhaustion. They were asthenic and enteroptotic. Diet and exercise were his panaceas.

BREATH SOUND TRANSMISSION

DR. A. MYERSON reported some observations concerning the use of the stethoscope over certain parts of the skull best carried out when there is little or no hair. No clinical deductions were offered.

NEUROLOGY AND PSYCHIATRY AT SAVENAY

DR. H. M. SWIFT reported some of his experiences at this base hospital. Nothing new was presented but the latent epileptic and encephalomyelitic residual cases offered the most striking material for comment.

NEUROPSYCHIATRY SERVICE AT VICHY AND SEVANAY

DR. D. J. MACPHERSON reported on the findings of 124 brain and 119 spinal cord autopsies made at the Vichy central laboratory. Meningitis from trauma of the brain or spinal cord, pneumonic meningitis, transverse myelitis from concussion, tetanus, syringomyelia, pituitary tumor and brain tumor were among the findings.

The speaker also referred to the large number of nerve injuries collected at Savenay.

CHICAGO NEUROLOGICAL SOCIETY

REGULAR MEETING, OCTOBER 16, 1919

The President, DR. L. J. POLLOCK, in the Chair

LUMBOSACRAL PARALYSIS

DR. G. B. HASSIN presented a boy of 18 who for two months had had increased difficulty in walking. As a child of four he had fallen split

fashion and then was confined to bed for nine months. Since then the left leg has always been a little smaller and weaker, but for ten years he has had little difficulty. For the past four years an increasing weakness in the left leg has been apparent.

At the present time there is a marked left lumbar scoliosis and the left leg is shortened and slightly atrophied. The motions of the left foot and toes are all abolished. Abduction of the thigh and flexion of the leg are the only well preserved activities in the left leg. Obturator and tibialis posticus distribution show completed R. D. Tendon reflexes of left side absent. The clinical picture resembles that caused by faulty reduction in congenital hip dislocation. In this case some of the lumbosacral plexus fibers were torn when the child fell and forcibly did the "split."

FACIAL PONTINE DIPLEGIA. TRAUMATIC

DR. G. B. HASSIN presented this patient, full description of which will appear in the JOURNAL OF NERVOUS AND MENTAL DISEASE.

SEX PERVERSION AND CRIME

DR. H. R. HOFFMAN gave this paper outlining the extent of sexual perversion which he says is very widespread. He estimates as high as 100,000 sex perverts for Chicago. In the city House of Correction from 2-10 per cent. are pronounced overt types, chiefly invert. Many individuals convicted of larceny and shop lifting were fetichists. Inversion seems as common among negroes as among the whites. Jealousy among the invert seems to be the chief precipitating cause for the committing of their crimes. The author is disposed to deal with the problem as a neuropsychiatric one rather than as a penological one.

DISCIPLINARY PSYCHIATRY IN THE ARMY

DR. H. M. ADLER presented this paper in which he called attention to the comparatively few delinquents among the 3,000,000 men of the army. It was expected on past experience ratios that 50,000 would need confinement. The actual number did not exceed 5,000, or the general civilian ratio seen in the average community in times of peace. He accounts for this as (1) prohibition, (2) neuropsychiatric board eliminations at draft stations, (3) distance from actual hostilities. Owing to the early termination of the war only 3,500 case records were available for the study of the mental aspects of army delinquency. These were like the average institution inmate excepting about 500 conscientious objectors. Of these nearly 20 per cent. were feeble-minded or had a psychosis. The average intelligence of the entire group was about equal to seventh grammar grade. Egocentric and vain, selfish and arrogant individuals made up at least 64 per cent. of the entire group. This type of individual was the responsible element causing three quarters of the disciplinary problems of the late army.

Translations

THE HISTORY OF THE SYMBOL

BY MAX SCHLESINGER

TRANSLATED BY SMITH ELY JELLIFFE, M.D., AND
LOUISE BRINK, A.B.

(Continued from page 161)

We have apparently obtained an insight into the far past of the word when, *συμβολή*, among its countless meanings differing so much from one another, we come upon an equation of it, though so rare and hidden, with *ἡ πλοκή*, that is twist, plaiting, network (*das Geflecht*). Only one inscription testifies to the existence of this. Was there in general a kind of work which was practised earlier than plaiting or weaving, which surpassed that in importance in earliest times, the production and the products of which were constantly before men's eyes? The joining together, winding one into the other, the binding together of the material is the most essential thing of this handcraft and a nimble plaiter appears to move the twigs or straw, rushes, fibers or hair so rapidly that it might in all justice be called throwing them together, that is *συμβάλλειν* and the work a *συμβολή*. In this way the original because concrete meaning of *συμβολή* might be given as the uniting of different parts into a whole, which first appeared quite as a sense perception before the eyes in the plaited work. This explanation seems yet more likely when we read in Herwerden's lexicon: "Chalcidenses ita (*συμβολή*) vocasse tēnias docet Alexidis, frag. 123" ["Alexidis, frag. 123, teaches the Chalcidenses to call the wreaths or fillets thus (*συμβολή*)."] So the inhabitants of Chalcis must have named their headbands and fillets *συμβολή*. These were naturally woven. When Alexis adds *et ampullas unguentarias*, that is ointment jars, we can observe a process which often recurs in the history of language, when that which serves a similar purpose, although it is of quite another origin, is designated by the same sign. (This work gives further confirmation for this in another place.) It goes without saying that no sort of woven flask was used to preserve ointments which soon evaporated, in a time when men knew

how to produce more compact vessels. So we may here according to the sense relate *συμβολή* only to headbands and fillets, thus one of the very frequent products of plaiting craft.

A young race, which takes its speech images from its daily life, could not pass by this happy comparison from weaving which can be employed in so many relationships. The image strives for a close union of different parts, at first similar then also opposing, into a whole. From the object it passes over to human relationships, from these again it leaps over to figurative paraphrase of a language still poor in concrete terms, reëchoing with different sound and denoting something else according to whether the poet or the philosopher, the grammarian or the soldier has carried it over to his territory.

Also confusions with the similarly sounding plural of *σύμβολον*. have crept in.

There are furthermore the following stages in the use of the transferred meaning:

The most homogeneous similar thing bound, which is named *συμβολή* through its indissolubility into an indivisible whole, is the confluence of various water courses into one stream. More will be said of the fact that much more frequently *σύμβολον* is used for this.

As here different parts are united in a whole, so *συμβολή* is the name given to a company of different members who come together from all quarters and bring food and drink for a common banquet so that the givers are forgotten in the gifts. When affairs were carried on through money instead of through natural means, contributions of money were reckoned in place of natural commodities, and the coins used were as little distinguished among themselves as in the former image the confluent streams of water. The love feasts, called *ἀγάπαι* in Greek, rest on the same basis. As the love, upon which very often a wrong emphasis was laid, receded into the background every banquet was called *συμβολή*. The name remained in use therefore a long time. We come not infrequently in the cloisters of the Middle Ages and also of later times upon edicts of bishops or abbots, or decisions of the councils, which refer to the limitation of the luxuriousness and debauchery at the feasts (*symbolis*).

These assemblages remained the essential thing in the idea and as they attained a place as a higher companionship united in intellectual enjoyment, those in which scientific questions were discussed were again called *συμβολή*.

The intercourse extended itself over wider distances which made a personal assembling impossible. It was agreed by the members to express themselves in writing over the topics in order at the time

and the learned contributions were brought together in compilations, which then received the same name. This custom extended itself very widely and the designation *Symbolæ litterariæ* can be shown to have been retained to the middle of the nineteenth century, many times with the addendum, which clearly betrays its origin; *a variis amicis collectæ*. The royal library at Berlin possesses works styled thus, which have appeared in from one to three volumes each in Florence, Bremen, Halle and The Hague between 1744 and 1777. Still in the year 1839 the *Publici gymnasiorum doctores* issued to Amsterdam and 1845 to 1848 a scientific convention at Batavia issued to Utrecht *Symbolæ litterariæ* mingled with *Nederduitsche Bijdragen* [contributions of the Netherlands] and Jakob Grimm reviewed the "*Symbolæ ad geographiam mediæ ævi ex monumentis islandicis*," written by E. Chr. Werlauff, 1821. The long-winded introductions and dedications nowhere explain this term, therefore it must have been sufficiently well known in this significance. In 1899-1900 there appeared under the title *Symbolæ physiciæ* the publication of researches in natural sciences, which Hemprich and Ehrenberg¹⁴ had brought with them from an African journey in the years 1820-1825.

Nevertheless the word takes also the other course which springs out of its fundamental idea. It was used to denote gatherings of every sort, friendly assemblages and love meetings, but also meeting together for a hostile purpose, so that in an exaggerated sense the battle is also called *συμβολή*.

Plautus calls a load of cudgels which some one holds in a community brawl by the same name. The grammarians employed both idea and word for different purposes, while they so designated the placing together of semi-vowels with consonants and the form of reply known as symbolic, which comprehends in Yes and No a complete sentence.

In the church service of the Middle Ages the receptacle used as the depositary for the Host, whether made from simple or costly material and more or less artistically decorated, was called *symbola*, the name of the content being extended to the inseparable whole.

It is noteworthy that the dictionary of the lexicographer Suidas (about 970 A.D.), a fundamental work, contains no article on *συμβολή*. On the other hand later scholastics have occupied themselves thoroughly with the word. We might mention a controversial treatise against the Greek sophist Polydeukes by the eminent philologist Casaubonus¹⁵ (born 1559), who devoted the instructive thirty-first chapter to the difference between *συμβολὰς* and *σίμβολα*. His father-in-law Henricus Stephanus has also agreed with his view and

according to the statement of Otto¹⁶ Salmasius also in the work *De Usuris*, which unfortunately is not obtainable. The dissertation of a Marburg student Jo. Nicol. Funchius of the year 1744 may be mentioned here. It devotes a very long paragraph to the same theme without contributing anything new.

The explanation for the first obvious use of the concept and the word τὸ σόμβολον easily offers itself in Greek myth and history and in the events of daily life, which are of necessity frequently repeated. There was understood under it a sign of such clearness that it almost excluded mistake, and so that which was the sign and that which was denoted, so to speak, fell together (συμβάλλεσθαι). There would however frequently have been need of an action here, which would easily bring the recognition, by which, as we shall immediately see, those seeking knowledge would be obliged to bring their symbols so near together that one might justly and rightly speak of a throwing together (συμβάλλειν).

We meet not seldom with productions in which abandoned children were recognized again by certain natural marks or artificial tokens. (The abandoning of children was not forbidden in Greek and Roman antiquity, was even often prescribed in earlier times. Mone informs us of the same custom or evil custom in ancient Iceland.) We see married couples who, separated from one another by a very long absence, have found one another again through stipulated signs; the same thing with friends bound by hospitality who, though far removed by time and space, wished to maintain intact the bond between them for themselves and their descendants. For the exercise of hospitality was not only enjoined, but it was a sort of prudence to assure to oneself and one's family as many considerations as possible in whatever might befall them in foreign lands.¹⁷ At first to be sure custom required that the stranger should be received and entertained without his name or race being demanded. Then his acquaintance was sought and gifts were exchanged with him where possible, from which thus early the custom was built up of formal tokens of remembrance and recognition (σύμβολα). The usual thing was that the host and guest before parting broke in two a small piece of wood, a die or a ring and each one took a half for himself. They had at their later meeting, by fitting the two halves together, a fairly unerring means for recognizing one another again or even for associating themselves in relationships of friendship into which earlier generations had entered. This ancient custom, practised throughout the entire world of antiquity, which consisted of the actual joining together of two halves to a former whole, may

be looked upon as the concrete first stage for the idea τὸ σύμβολον. It was a token for recognition, invented by necessity, that abolished distance, could extend over many years, since it was naturally carefully guarded, and was also comprehensible by those who spoke another tongue. A tale of Plutarch teaches us that the relationships of guest friendship were everywhere known, openly acknowledged and later had become very numerous. He relates that Alexander the Great at the destruction of Thebes, besides granting free passage to the priests, the descendants of the poet Pindar and all those who had raised their voice against the rebellion, granted it also to the guest friends of the Macedonians. Since it is recorded that 30,000 heads were sold into slavery, there must have stood a considerable number of citizens in guest friendship with the conquerors, since mention is made of them at all.

These small tablets were called *tesseræ* by the Romans from *τεσσαρες*, derived from the four sides of the die, and the language, intensifying itself, formed the idea for friendship from the Greek numeral making it *contesseratio*. These tablets and rings were later provided with names, also adorned with figures, especially with that of Jupiter hospitalis, moreover one finds at times a hand engraved upon them. The hand clasp, which strengthened the friendship through a gesture, found its graphic representation in the figuratively portrayed hand. A museum in Paris possesses the bronze hand—*dextræ hospitii insigne* (Tacitus)—with the inscription: Σύμβολον πρὸς Οὐελαννίους. Friedrich Münter describes a Carthaginian *tessera hospitalis* which has come down to us. It is of ivory, represents on its convex side two hands clasped in one another, the natural symbol of friendship, and has on the flat side a badly preserved Greek inscription, whose interpretation presents difficulties. It is at all events a *tessera hospitalis*, exchanged either between two Carthaginians, Imilcho and Imbal, or between these two and a Greek Lyson.

The simple custom of a childlike people, for whom it was necessary to find the means to send messages to distant places, maintained itself when the need for it had long disappeared. The instrument became refined to an artistic object and an object of adornment.

The custom, beside providing access and recommendation to one's guest friends, not only for one's own kindred but also for strangers, found naturally an ever greater extension and with it also the term σύμβολον for the introduction of ambassadors to foreign princes, for the voucher for those unknown, for passports from strangers.

The particularly cultivated intercourse with the Greeks of Lower Italy gave the Greek stamp to the Roman guest friendship, for which the use of the word clearly speaks.¹⁸ The juristic instinct of the Romans developed the idea and the institution still further. Four varieties of *hospitium* were distinguished according to whether it was entered into between independent communities or between two single individuals or between a community and an individual or finally between all the members of two communities. The guest covenant rests upon the declaration of will of the two parties and is binding upon their children and descendants. It is concluded through *sponsio*, handclasp, in later time by writing (*συγγραφή*), also the notice of it required the corresponding form. The simple sign of the guest suffices between private individuals, the only relationship we have here to consider. The private guest was a participator in the family life; at his arrival bath, sacrifice and meal were prepared. He tarried often for a long time at the house and entered into a filial relationship toward the head of the house, who provided him, as long as he was there, protection and active assistance especially in legal disputes, and, when he was absent, took care of his business in Rome. It was counted an honor for all Roman statesmen to open their houses to countless guest friends and dedicate their services to them and the state permitted the nobility to make their influence felt in the provinces in this fashion.

The word maintained itself for the tablets when it had long since ceased to be used for the unspoken sign language which had yielded to the written language; wooden, ivory, bronze writing tablets, all objects upon which and through which the will of the power of the state was expressed, Justinian called *Symbola*. In Greece the treaties between different states for the establishment of the administration of justice in disputes between the adherents of both sides were called *Σύμβολα*. Such treaties were concluded upon the foundation of the freedom of the person, the property and the intercourse of the citizen of the one state within the borders of the other, while, if no treaty existed, every one was judged according to the right of the country where he came into dispute. In Athens these disputes were informed against and decided before the Thesmotheses [lawgivers; six junior archons] in the *δίκαις ἀπὸ συμβόλων*, [courts of the treaties].

Pollux informs us from the Fragments of Aristotle that the Thesmotheses *τὰ σύμβολα τὰ πρὸς τὰς πόλεις κυροῦσιν* [ratify the treaties which relate to the cities]. Meyer and Schömann¹⁹ think that the mildly toned expression *σύμβολον* for this treaty form was chosen

by the Athenians only out of political considerations although they simply forced their conditions upon those who entered into league with them. Besides between Athens and Macedonia no *σύμβολα* existed.

Tokens were interchanged between two peoples at the adjustment of mercantile disputes which were called *σύμβολα*. Mention is made of such actual tokens in the covenant of friendship between Athens and the king Straton of Sidon “Ποιησάσθω δὲ καὶ σύμβολα” [“And let there be made also *σύμβολα*”], also in alliances with cities, kings and foreign peoples.

As long as private covenants, for example, testaments, codicils, were concluded as in ancient times by word of mouth they were called *σύμβολα*, the later ones, which for their validity required to be put down in writing *σύγγραφα*. Already the new cultural period shows the word sequence, which causes the well-defined expression, no longer to be misunderstood, to appear in place of the hazy word form of the patriarchal period.

There is in the “Bildern antiken Lebens” by Theodor Panofka²⁰ a vase, which can be found in Munich distinguished by its “rare artistic value and archæological interest,” which the editor interprets in the following manner: “Alkinoos, the Phæacian king, received as a guest upon Scheria, Jason returning home victorious with the Argonauts, who arose from the race of the Aeolides of Iolkos, inasmuch as his grandfather was Kretheus the oldest son of Aeolus. This latter circumstance explains the tokens (*σύμβολον*) marked with the name Σίσυφος, another son of Aeolus, which Jason presented to the prince as his recommendation, like the cards of introduction of our day, also as a parchment and ancestral letter.” The artist had not been able to make visible upon a ring divided into halves or upon another emblem the name that was of importance to him, and represented therefore the occurrence unhistorically making use of a parchment.

The token, which had once served for recognition, early found occasion to be employed as an acknowledgment and kept the same for all insignia which kings and those in authority bore and which made them known: crown, diadem, scepter, throne, frontlet, lance, sword, staff—the staff which the Athenian judges carried—the ivory ornaments upon the shoes of the Roman senators and the golden cases which their sons and later all children of good birth wore around the neck with an amulet. The token of the king passed over as usual at first from the king to his cohorts. In military affairs it found use as field sign, password, rallying cry, signal, further

for the purple tunic and for the insignia of war which were borne before the prætor.

The σύμβολον claims almost greater extent in household life and in the language of the mercantile class of antique peoples. Here were the commercial contracts inscribed upon bronze shields, which denoted the names of the merchants and the kind of wares; the tablets of olive wood and box-tree, of brass, lead, stone, glass, and horn for the levying of grain and oil, the ancient forerunners of our bill of lading and checks; the small coins which were given as earnest-money at the conclusion of a contract, a symbolic form of partial advance payment, pattern for the transaction, promise of payment at the giving over of the token, security. A form of speech mentioned by Casaubonus calls the very poor man *Ne symbolum quidem habet*, one who never once was able to gather together a security. Finally there was the ground of every business transaction, the normal measure, the *mensuræ normales*, σύμβολα σηκώματα [standard weights], which were set up as controls under surveillance in special buildings or in public places and which were watched over by those especially appointed to guard them.¹⁷

In the customs this is the term for the duties paid to the state, receipt for taxes, also licenses for the use of camel routes leading through the wilderness. The variety of uses weakened the idea more and more. The word was used also for the tokens at the exchange of which, for example, the Athenian judges received their pay. Pericles had introduced a compensation of an obolus, equal to about three cents, for the session for the citizens who were occupied in ever increasing numbers with judicial affairs, the number of which arose to six thousand. The amount was later doubled and tripled. From Aristotle's Fragments we discover that every hall of justice had its color or its character in agreement with its judge's staff. At his entrance into the hall the judge received the σύμβολον from the Prytanes, who were entrusted with its disbursement. Then it passed for a sign of attendance in the popular assembly, signified also the tokens which the Roman Cæsars threw among the folk in the Circus and at the appearance of which a libation followed. In part they had the character of lottery shares, to which different sorts of gains accrued. Augustus used instead of them small inscribed balls for which garments were handed over.

(To be continued)

Current Literature

II. SENSORI-MOTOR NEUROLOGY

3. SPINAL CORD.

Flexner, S., and Amoss, H. L. EPIDEMIOLOGY OF POLIOMYELITIS. [Jl. Expl. Med., 29, April, 1919, Ed. J. A. M. A.]

The increasing knowledge of the distribution of the microorganisms that are the etiologic agents in the occurrence of several epidemic diseases has focused attention on the prevalence of carriers, formerly unsuspected as factors of danger to the environment in which they exist. The demonstration that apparently healthy persons may harbor bacteria of a pathogenic sort is now accepted universally in the case of the organisms responsible for typhoid fever and diphtheria. Healthy carriers are by no means always immune to the germs which they innocently harbor, as the experience with hemolytic streptococci, responsible for the secondary infections following in the wake of scarlet fever, measles, smallpox and influenza, clearly indicates. It is not doubted at present that there are healthy carriers of the virus of poliomyelitis, regarding the epidemiology of which much remains to be ascertained. The virus has been detected in the secretions of the nasopharynx not only during the period of attack by the disease but also in healthy persons who have been in contact with cases of poliomyelitis. Obviously an intelligent method of control of the spread of an epidemic presupposes dependable information regarding the distribution of the etiologic agent. Swedish observers have championed the view that chronic carriage of the virus of poliomyelitis is common; but the present painstaking critical and experimental studies are not in accord with this conclusion. Their deductions are to the effect that the virus is regularly present in the nasopharynx in cases of poliomyelitis in the first days of illness, and especially in fatal cases; that it diminishes relatively quickly as the disease progresses, except in rare instances; and that it is unusual for a carrier state to be developed. Hence the period of greatest infectivity of patients would appear to be early in the disease, which is probably the time at which communication of the virus from person to person takes place. The American investigators adduce, in support of their conclusion, the observation that the communicability of poliomyelitis during the wide epidemic in this country in the summer and autumn of 1916 was a phenomenon chiefly of the early stages, while the frankly paralyzed person and the convalescent were to be feared much less. Correspondingly, at

the Rockefeller Institute experimental infection was secured with tissues obtained during the first week, approximately, of the disease, but not at later periods. It seems unlikely, therefore, that healthy and chronic carriers of the virus are numerous. In any event, preventive measures against the spread of epidemic poliomyelitis should unquestionably be centered on the actual patients and particularly early in the course of their infection.

Adson, A. W. SPINAL CORD TUMORS. [Minnesota Medicine, 2, June, 1919.]

A series of sixteen cases in which laminectomies were done for spinal cord tumors is cited by Adson. The cases are said to represent fairly well the ratio of cord tumors to allied conditions, and the results accomplished by surgical treatment. Three patients recovered after the removal of the tumors, two have improved to such a degree that they are able to take up their regular work, although there still is some weakness in one of the extremities. Two are slightly improved; they are able to control bladder and bowels, but are unable to work or go about. One patient improved markedly for ten months and returned to his regular duties, but he had a return of symptoms, and on recent examination and reoperation a lordosis was found with compression of the spinal cord. There was no recurrence of a tumor but many adhesions had formed and destruction of the cord itself had taken place at the lower part of the curve. This apparently was due to the lack of support, as the cervical vertebræ had separated and slipped forward. In five cases in which it was impossible to remove the tumors, an extensive decomposition was done and the dura left unclosed. Two were cases of intramedullary tumors, one a case of degenerative fibroma and the other was so necrotic that a diagnosis was not made. One patient presented a definite history of lues that had been treated without results; he also had a definite sensory level. In view of this, an exploratory operation was done and an angioma of the cord was found. It was not removed, but the vessels were ligated *en masse*. The patient made a steady and progressive recovery, and is able to go about his regular work. A fourth patient in this group gave a definite history of a unilateral lesion and on operative exposure a unilateral, infiltrating inflammatory tumor was found. The tumor was not removed on account of its extensive involvement in the cord itself; the patient has not improved. In the fifth case of non-removable tumors, there was a definite history of syphilis nine years before with a development of a spastic paraplegia and a definite sensory level. A gumma of the cord involving the meninges was found. Again, results were unsatisfactory. In addition to the operations in the thirteen cases of spinal cord tumors, three cases in which the lesions were questionable were explored. A meningomyelitis, with increased cerebrospinal pressure was found. One patient did not improve, and gradually

became worse; the second patient recovered and at present is doing his regular work, and the third died on the second day with a typical picture of fat embolism. This was the only death in the series. [J. A. M. A.]

Bolten, G. C. TUMORS OF SPINAL DURA MATER. [Med. Tijdschr. v. Geneesk., Aug. 10, 1918.]

Bolten bases his discussion principally upon ten cases of primary tumor observed within one year. Eight of these were operated upon, three of the patients recovering. He does not attribute the fatalities to the laminectomy, which he considers attended with little danger, but to the debility of the patients or to intercurrent pneumonia. One case, which refused operation, improved remarkably under roentgen treatment and during the six months succeeding had shown no return of the former violent neuralgia or motor disturbances. Bolten finds paresthasias and neuralgia as the usual first symptoms, though sometimes there is first an interruption in functional activity. Complete interruption of the functioning of the cord is seldom done away with even after operation, though the pain may be removed. A metastatic tumor in the dura he regards as hopeless. These are rather commonly associated with ovarian and prostatic tumors. Roentgen examination is negative unless the tumor is a calcified fibroma. Roentgen examination should, however, never be neglected since its positive findings are very valuable. [J.]

4. MIDBRAIN, PONS AND CEREBELLUM.

Owen, S. A., and Leighton, P. A. BULBAR SYNDROME. [Lancet, June 11, 1919.]

A woman, 47 years of age, had premonitory occipital headaches of the left side, then an acute attack of vomiting, hiccup, tinnitus on the left side and marked giddiness without loss of consciousness. There then developed forced positions to the left, hypotonia, and cerebellar ataxia; nystagmus, dysarthria and palatal and vocal cord palsy; pseudoptosis, enophthalmos and myosis. There was analgesia and therm-anesthesia. Otherwise no sensory changes. Paresis of the sternomastoid and trapezius. Negative Wassermann; sensibility otherwise normal.

Spielmeyer, W. THE CEREBELLUM IN TYPHOID. [Münch. m. Woch., March 21, 1919.]

Small rosette-shaped foci or gliomatous arborizations seated in the superficial stratum of the brain and cerebellum in cases of typhoid are here described by the author. The cerebellar changes were found in five cases of typhoid which came to autopsy. A comparative study of other infectious diseases, such as paratyphoid, influenza, dysentery and malaria,

shows that these particular morbid changes are not found. The writer also points out the fact that the five cases of typhoid offered unusual features in the symptomatology.

Albo, W. L., and Hormaeche, G. CEREBELLOPONTINE FALSE TUMOR. [Plus-Ultra, 2, February, 1919, J. A. M. A.]

In the case reported by Albo and Hormaeche they located the morbid process exactly in the cerebellopontine region, but instead of the anticipated tumor it proved to be a cyst from chronic circumscribed serous arachnoiditis, in the lateral cisterna. There seem to be no means for distinguishing between a cyst and a tumor in this region, and it is a difficult matter to locate the process at an early stage, before important nerves are suffering from the pressure. The necropsy findings in this case suggest that if the extremely tardy and slight participation of the involvement of the right acoustic nerve had been heeded during life, it might have revealed that the process compressing the trigeminal nerve (neuralgia), the facial nerve (paresis), and the vestibular nerve (vertigo and reduced excitability) could not have originated in the acoustic-vestibular trunk nerve. The three cerebellar seizures which the woman had had were at first ascribed to hysteria. These cerebellar seizures or vagal attacks seem to be peculiarly characteristic of tumors in the arachnoid costernæ. Cushing ascribes them to fluctuations in the tension of the fluid in the cisternæ. The fact that the first symptoms coincided with some infectious process, puerperal fever in this case, is presumptive evidence in favor of a cystic tumor rather than a solid tumor. The cerebellar hemisyndrome may be lacking entirely in cases of arachnoid cyst of the lateral recessus but, on the other hand, the intracranial tension and the atrophy of the optic nerve may be as extreme as with an intracranial tumor. With suppurating otitis or mastoiditis, pus may accumulate in the cerebellopontine region and induce all the symptoms of an intracranial tumor at this point, as the deafness from the primary process aids in misleading the diagnostician. There may even be homolateral cerebellar symptoms. Hormaeche diagnosed and successfully removed an accumulation of pus in a case of this kind.

Bassoe, P., and Hassin, G. B. HISTOPATHOLOGY OF EPIDEMIC ("LETHARGIC") ENCEPHALITIS. [Archives of Neurology and Psychiatry, II, 24, July, 1919.]

The pathologic changes in epidemic encephalitis were studied in three cases, two of which were in adults and one in an infant four weeks old. Changes were found in the meninges, cortex, subcortical regions, pons, medulla and spinal cord, that is, practically all over the nervous system. They involve the parenchyma itself, as well as the glia and the mesodermal elements (vessels and blood elements). The meningeal and vascular changes were in the form of marked infiltrations with lympho-

cytes and plasma cells though other cell types, like polyblasts, fibroblasts, rod cells were also present but in fewer numbers. A notable feature was free invasion by the infiltration cells, of the parenchyma of the cerebellum, its molecular layer, and especially of some subcortical regions, like optic thalamus, substantia nigra, aq. Sylvii, etc. The latter regions also showed very intense peri-vascular infiltrations which were comparatively much less marked in the cortical areas or cerebellum. Some of the smaller vessels in the above-named regions also showed hyaline thrombi, though the majority of the vessels were free from any occlusions or changes in their walls. Equally uncommon were hemorrhages, which when found could be considered as terminal ones, as any reactive phenomena around them were absent. The parenchymatous changes were in the form of various ganglion cell changes, though many ganglion cells especially in the upper cortical strata were practically normal. Neurophagia and satellitosis were quite frequent in the deeper layers of cortex and in the sub-cortical regions, neurophages being mostly glia cells and in some instances plasma cells (illustrated by three photomicrographs). Glia tissue changes were absent except a marked increase in glia nuclei, without any regressive changes, like amœboid glia, etc. In the spinal cord many spider cells could be seen, and numerous red spherules scattered over the white and grey matter of the cord, as well as in the adventitial spaces of Virchow-Robin and the ependyma cells of the central canal. The latter showed proliferation of the ependyma cells and was usually occluded by an amorphous mass and some elements that could not be defined by any staining method. The pathologic changes are described in detail and compared with those to be found in paralytic dementia, African sleeping sickness (trypanosomiasis), poliomyelitis, and various forms of acute encephalitis. The authors came to the conclusion that the epidemic type of encephalitis bears the greatest resemblance to the African form of sleeping sickness and greatly differs from those cases which were described as influenzal encephalitis. The close anatomical relationship also suggests in their opinion an etiological one, in the form of a parasite akin to a trypanosome. The article is illustrated by twelve photomicrographs and three colored pictures. [Author's Abstract.]

Claude, H., et Schaeffer, H. LETHARGIC ENCEPHALITIS. [Bull. Soc. Méd. Hop., 43, May 23, 1919.]

A woman of 42 years of age developed a headache which after one week's persistence was followed by great sleepiness and orbicularis palsy. Death ensued within three weeks with marked pyrexia. Autopsy showed non-hemorrhagic encephalitis of the lower medulla, the isthmus and parts of the oculomotor nucleus.

Heiman, H. ENCEPHALITIS OF INFLUENZA. [Am. Ped. Soc., J. A. M. A., July 19, 1919.]

From a study of the relations of this condition to influenza, the author expresses the opinion that the most appropriate designation is "post-influenzal encephalitis." He has been able to differentiate three main forms depending on the severity and the most prominent symptoms. These may be grouped into (1) irritable, (2) lethargic and (3) lethargic with paralysis. The irritable type is characterized by marked restlessness, excitability, and almost continuous crying. In the lethargic type, as the name implies, the most prevalent feature is a drowsy state. The facial features are expressionless, resembling the Parkinson syndrome. There may be convulsions or twitching of the face muscles. There is frequently moderate rigidity of the neck. Most of the cases fall into the third group of lethargy with paralyzes. In this type he finds, in addition to the stuporous state, some forms of paralysis and frequently convulsions. There may be an involvement of the extremities or cranial nerve palsies. All of these cases gave a history of previous influenzal infection. In one child the nervous syndrome followed immediately, and in another as long as four months had elapsed. The average was about two weeks. Convulsions were the first manifestation in three cases, stupor in four. Drowsiness and stupor continued as prominent symptoms throughout the course of the disease. Fever played a small part in all the cases. The fundi were examined in all these cases, but showed nothing characteristic. Of eight specimens of cerebrospinal fluid, only one showed definite changes. There were 80 cells per cubic centimeter, albumin was present, and there was a definite reaction to Fehling's solution. There were no uniform changes in the blood picture. The prognosis was better than the alarming state of the patient would indicate. There was no specific therapy. In the irritable type, mixed bromids and chloral were of some value. Lumbar puncture had not proved of special benefit.

Etienne, G. LETHARGIC ENCEPHALITIS. [Bull. Soc. Méd. d. Hop., 43, 18, 1918.]

A girl of 17 years of age suddenly became sleepy and developed a diplopia and slight facial palsy, which latter persisted after her recovery at the end of three weeks. The spinal fluid had been normal. An elderly man about the same time suddenly developed delirium and high fever, then deep somnolency, with death the second day.

O'Carroll, J., and Nesbitt, G. ENCEPHALITIS LETHARGICA IN IRELAND. [Dublin Journal of Medical Science, May, 1919.]

These observers, from a study of four cases and a review of the literature, decide that MacNalty's summary of diagnostic features is correct. In the prodromal period an initial catarrhal affection, particularly conjunctivitis, may be suggestive. A change in the patient's mental atti-

tude, taking the form of emotional changes, apathy or extreme restlessness, progressive lethargy, and drowsiness indicate the possibility of the disease. If these symptoms are accompanied by headache, vertigo, asthenia, diplopia, and diminished visual activity, the possibility is further strengthened. In the acute illness there are initial pyrexia, the characteristic attitude and masklike face, a profound stupor from which the patient can usually be aroused; its alternation in the early stages with delirium; asthenia, rigidity, emotional characteristics, speech changes, retention of urine, tremors, vomiting, and obstinate constipation. The transient nature of cranial nerve paralysis when present is almost conclusive; the frequency of ptosis, paralysis of the ocular muscles, diplopia, facial paralysis, and ocular incoördination are of value. The rarity of bilateral facial paralysis in other forms of nervous diseases and its frequent occurrence in encephalitis is an additional point in diagnosis. A negative sign of value is the absence of optic neuritis. The prognosis is better than might be expected, as there were only thirty-seven deaths in 160 cases in England. Until the virus is isolated and specific methods obtained, the treatment is mainly symptomatic, and hexamine in large doses is inadvisable on account of its liability to cause hematuria.

Karyophyllis, G. LETHARGIC ENCEPHALITIS. [Grèce Méd., 21, Jan. 1, 1919.]

The author describes the clinical history of three cases, all young adults. Two women died and the third, a boy of 17 years, was sick four weeks. He had lethargy persisting two weeks and had a residual optic nerve atrophy with blindness and paresis of the lower extremities.

5. MENINGES.

Warwick, Margaret. CEREBRAL HEMORRHAGE OF THE NEWBORN. [Am. Jl. Med. Sciences, 158, July, 1919.]

After a review of the scanty literature on the subject the author presents the findings of cerebral hemorrhage in young infants at the Minnesota University Hospital. In 36 routine autopsies on newborns, 18, or 50 per cent., showed a hemorrhage in some part of the brain. Of the 18 babies 11 were of average weight or below and 7 above. Of the mothers 11 were primiparæ and 1 of these was over 30 years of age, 1 was 29 and the remaining 9 were 24 years or under, suggesting that the first labor may be the etiological factor in young as well as older mothers. Forceps were used but once and then in delivering a mother dying of pneumonia of a small six-months' fetus. Labor was markedly prolonged in but 2 cases in both of which twins were born, in each instance the first one being normal and the second showing cerebral hemorrhage. Only 2 of these infants were stillborn and 4 showed signs of

asphyxiation. All but 2 showed respiratory symptoms from birth. The most important fact is that 8, or 44 per cent. of the series, exhibited hemorrhages in other organs than the brain, while 5 of the 8 vomited blood before death, thus placing the syndrome known as "hemorrhagic disease of the newborn" among the most important of etiological factors. None showed any signs of syphilis, but $\frac{1}{4}$ were prematures. The majority of the cases (72 per cent.) showed the hemorrhage over the cerebrum where the vessels leave the longitudinal sinus and, unprotected by the dural adhesions of later life, are very susceptible to injury during molding of the head, particularly overriding of the parietal bones. An attempt at a classification based on etiology is made:

- I. Traumatic injury to blood vessels during molding of the head in either normal or precipitate deliveries.
- II. Congestion or stasis with rupture of veins in labors protracted or complicated from any cause.
- III. Intra-uterine disease of any type in the child, including toxemias of the mother.

In conclusion, attention is called to the fact that the condition is often a complex disease syndrome giving rise to diverse clinical symptoms, modes of death and pathological findings and also that it may not be brought about by any single case but by an interaction of a varying number of causes which may be found in the circumstances governing labor in the condition of mother or child. [Author's Abstract.]

Seefisch, G. CHRONIC HYDROCEPHALUS AND CHRONIC EDEMA OF THE PIA (MENINGITIS SEROSA) FROM TRAUMA. [Berl. kl. Woch., 1918, No. 27.]

The author concludes from this study of some of the later effects of trauma of the skull: (1) That the term serous meningitis following injury to the skull is better termed acute or chronic hydrocephalus interna or externa traumatica. (2) These edemas are by no means infrequent consequences of even apparently minor injuries from war wounds of the skull. They present clinical pictures in the minor grades which are frequently called neurasthenia. (3) Following injuries healing frequently takes place only after proper operative removal of the scar, relief of depressed fragments, etc. Lumbar puncture often temporarily relieves but is not curative. (4) Operative procedure is best carried out in two stages.

Delater et Calmels. ANTHRAX MENINGITIS. [Bull. Soc. Méd. Hop., 43, April 4, 1919.]

An American soldier had died in two days with symptoms of fulminating meningitis. Anthrax bacilli were found in the cerebrospinal fluid. The infection had come from a pustule in the cheek.

Bonaba, J. MUMPS MENINGITIS. [Arch. Lat. Am. de Pediatria, 13, 1919, No. 2.]

Although a rare complication a meningeal reaction to mumps, usually mild, does occur. The author reports some cases and reviews some of the literature. Thus he cites Morquio's case of total deafness, and other cases of encephalitis, optic neuritis, herpes zoster and polyneuritis due to mumps. Lymphocytosis is usual but is not always present. Massary in examining 635 soldiers found lymphocytosis of the fluid in both soldiers with or without clinical signs of meningeal involvement. Bradycardia and Sergents white line are frequent accompaniments of the meningism.

Canelli, A. F. WHOOPING COUGH AND MENINGITIS. [Pediatria, 27, June, 1919.]

Two infants, 6 to 23 months old, who died of whooping cough, showed changes in the meninges and brain. Both infants died in coma. The vessels were intact but there were minute hemorrhagic foci in the brain and meninges which the author would interpret as having arisen from some action of carbon dioxide from asphyxiation of the spasms. Mechanical factors such as rise in blood pressure from the coughing may have contributed.

Shaw, H. L. K. SPORADIC CEREBROSPINAL MENINGITIS. [Am. Ped. Soc., J. A. M. A., July 19, 1919.]

An infant on a farm developed cerebrospinal meningitis. There was no record of any previous cases in this locality, and the case was definitely traced to a soldier who had visited the home and fondled the child, January 28. The soldier said that to his knowledge he had never seen or been in contact with, or known of a case of meningitis in his regiment. He was found to be a meningococcus carrier. Nasal cultures from all other persons who visited the farm were negative. June 10, the organism still persisted, though the man had been under treatment and had used irrigations of all kinds. As the disposition of carriers is very largely a public health measure, a questionnaire was sent to the various state departments of health in order to ascertain their mode of procedure regarding carriers of meningitis. The answers revealed very little uniformity in the isolation of patients and in dealing with carriers. There were no provisions for the detection of healthy carriers and the compulsory bacteriologic examination of contact. Public health legislation on this subject is imperative if we are going to limit the spread of communicable disease. It is the duty of the pediatrician to keep abreast of public health progress and to assist in educating our communities in the new order of things.

Embleton, D., and Steven, G. H. PERSISTENCE OF CEREBROSPINAL FEVER CASES AS CARRIERS. [Lancet, May 10, 1919.]

These observers studied every patient passing through a large "carrier center" during a period of two years, taking postnasal swabs from each patient at weekly intervals and not regarding any case as having ceased to carry until three consecutive weekly swabs failed to grow meningococci. They tried all of the suggested methods of treatment for the cure of the carrier state but found that it was very doubtful whether any method of local treatment was of any material value when once the meningococci had definitely infected the deeper tissues. They found that wide variations in the proportion of positive results could be obtained by slight differences in taking the swabs and determined that the most effective way of securing the organisms when present was by means of a swab made of stiff, eighteen gauge, brass wire. The swab should be applied to Lushka's tonsil and pressed in firmly enough to cause a slight blood stain on a second swab applied later. The first swab should at once be touched to a petri dish containing a special medium, and after incubation for eighteen to twenty-four hours the colonies are ready for subculture and identification. The type of organism was generally determined by agglutination, and when necessary the saturation test was applied. It was found that, with rare exceptions, the type of organism found in the throat was always the same as that which had been isolated from the spinal fluid during the disease; that during convalescence the type of meningococcus remained constant; that reinfection by another type might take place under certain circumstances, but was rare. A man carrying one type of coccus was found to be relatively insusceptible to infection by other types. Out of 135 convalescents from cerebrospinal fever, 104 or seventy-seven per cent. were found to be carriers, and of those found negative a large number were admitted and examined before the standard of three consecutive negatives was adopted. Probably many of those would have been found to be carriers had proper examinations been made. The average duration of the carrier state was found to be six months.

Lemierre, A. MENINGOCOCCUS SEPTICEMIA. [Bull. Soc. Méd. d. Hop., 43, 18, 1919.]

This patient was negative as to microscopical or bacteriological findings, but reacted to agglutination tests, thus permitting a successful serum therapy. The symptoms included an intermittent fever and a recurring eruption. The thyroid was enlarged and there was an epididymitis, orchitis and parotitis, with slight meningeal reaction. The evening rise in temperature for four months suggested malaria. During the attacks there were severe pains in the legs and lumbar region. Atrophy of the legs developed.

Bell, A. S. CLINICAL METHOD OF DETERMINING TYPE OF MENINGOCOCCUS. [Lancet, May 24, 1919.]

Bell describes a simple and quite accurate method for typing the meningococci obtained by culture from the spinal fluid in acute cases. The results can be secured in twenty to twenty-four hours, as compared with the seventy-two hours or more usually required. The spinal fluid is cultivated and a very concentrated emulsion of the organism is prepared. One drop of each of the four type sera is placed on a glass and with each is mixed one drop of the culture. The mixture is examined with a small magnifying glass and the type is indicated by the serum with which agglutination first appears. If the result is not clear, or is negative after five minutes, pools of each serum are prepared containing two, three, and four drops each of serum. To each of these one drop of the bacterial emulsion is added and the results noted as before. If again the agglutination is not specific pools are prepared containing three, six, and twelve drops of the bacterial emulsion and the test is again applied by adding to each of these one drop of type serum, three tests being made with each serum. The results should always be confirmed later by the slow method usually employed.

Carter, A. H., and Boyes, J. T. CEREBROSPINAL FEVER. [Lancet, June 21, 1919, J. A. M. A.]

One hundred cases of epidemic meningitis chiefly due to the meningococcus were analyzed by Carter and Boyes. The average age of these patients was 23.05 years. Certain camps, without a necessarily larger body of troops present, furnished a larger number of them, and more fatal cases, spread over the whole period. No satisfactory reason for this is forthcoming. No seasonal or meteorological condition can be shown to have influenced the incidence or death rate, except that the larger number of cases occurred in the three winter months, December, January and February. No single symptom can be considered pathognomonic of the disease, and even a combination of the principal symptoms may not be positive. A positive bacteriologic finding alone is conclusive. No treatment appears to be so effectual as early continued lumbar puncture and injection of serum. Wherever possible a serum of the particular type affecting the patient is preferred. The most frequent and the most fatal type was Type 2.

Nelli, L. SYMPTOMS OF EPIDEMIC CEREBROSPINAL MENINGITIS. [Gazz. degl. Ospedale, 40, April 24, 1919.]

This observer has analyzed one hundred cases and states that headache, vomiting and herpes were seen in every case. Bradycardia, even down to 35 and 40 in some cases, was constant. The pulse becomes more rapid in the graver cases. Purpura with swelling of the joints was present in one patient. In two patients there was no pyrexia, yet these patients died.

Thomsen, O., and Wulff, F. MENINGOCOCCUS MENINGITIS. [Hospitilstidende, 62, April 23, 1919.]

This is an analysis of recent Copenhagen epidemics due to close contact in military barracks which they believe increases the virulence of the meningococcus. Five hundred new recruits from all parts of the country were taken on the training ship *Fyen* and within a week ten developed the most malignant form of meningitis. The distribution of 79 military and 114 civilian cases of meningitis during the two years in that district is illustrated by chart. The malignant petechial form occurred in 59 of the military and in 58 civilians. They reject the idea of a special strain of meningococci as being responsible for the petechial type.

Virulence is not a constant property, but waxes and wanes. The meningococci are found longest in the nasopharynx of convalescents from petechial meningitis. The differential diagnosis in fulminating meningitis is difficult. Blood cultures are usually negative, but meningococcus sepsis may be distinguished from other forms of sepsis by the great accumulation of gram-negative cocci in the endothelial cells of the vessels in the skin of a petechial lesion.

Colard, A. MENINGOCOCCUS. [Arch. Méd. Belges, 72, Feb., 1919.]

Seven different forms of meningococcus septicemia are separated by Colard. The tendency to relapse is pronounced; one of his patients had five. Septicemia was evident in 25 per cent. of his cases. The advantages of giving the autogenous vaccine by the vein, beginning with small doses was evident. Every fourth day he injects 1 c.c. of an autovaccine obtained from a culture killed by heat at 55 C. for half an hour, with addition of 0.5 per cent. of phenol. Some anaphylactic developments may occur but such may be controlled by adrenalin.

Olitzky, P. K. EFFECTS OF ANTIMENINGOCOCCIC SERUM IN AN EPIDEMIC IN HONG-KONG. [Journal of Tropical Medicine and Hygiene, February 15, 1919.]

The author notes that in a series of 417 cases of epidemic cerebrospinal meningitis treated in Hong-Kong, 104 patients did not receive either serum or lumbar punctures, obtaining merely the usual Chinese treatment. Of this number, 84.6 per cent. succumbed. Among 228 patients receiving Chinese treatment but also one or more lumbar punctures, the mortality was 51.1 per cent. Among fourteen patients treated by lumbar puncture only the mortality was 57.1 per cent. Among seventy-one patients receiving one to five lumbar punctures and also a more or less incomplete serum treatment the mortality was forty-five per cent. Comparative tests of the serum locally produced against Flexner serum showed the former to be very low in antibody content. Olitzky recommends intraspinal injection of thirty to sixty mls of good serum. While the temperature remains high and the meningococcus is

still present in the spinal fluid, the injections may be repeated every twelve hours. Later, they are to be given every twenty-four or forty-eight hours. In severe cases it is also advised to give fifty or 100 mils of serum intravenously. In four out of ten moribund cases in which blood cultures were made the meningococcus was found in the blood. Intravenous injection is especially indicated where there are signs of meningococcic septicemia, such as skin hemorrhages or joint affections, and in fulminating cases.

6. BRAIN.

Ayers, Howard. VERTEBRATE CEPHALOGENESIS. [Jl. Comp. Neurol., 1919.]

IV. Transformation of the anterior end of the head resulting in the formation of the "nose."

Phylogenesis of the vertebrate nose based on a detailed study of the anterior end of the head of amphioxus, ammocetes, petromyzon, bdellostoma, and chimpanzee, together with a consideration of previous anatomical discoveries by several anatomists relating to the terminal and vomeronasal nerves. The nasal septum of vertebrates stands out as an ancient landmark in vertebrate anatomy. We recognize the anterior end of the head of amphioxus as the earliest condition of this structure among living forms. It becomes the nasal septum of vertebrates after the trigeminal nasal hood has housed it in. The variations in the dimensions of the septum and the size and disposition of the nasal chambers are many, but the fundamental morphology remains unchanged. The fact that the terminal, olfactory, and septal nerves are also present in the marsipobranchs studied by me, coupled with facts previously established for other vertebrates, including man, shows that three pairs of cranial nerves are included in the septal structure and hence are housed in the nasal chamber. The number of cranial nerves in man is therefore fourteen, not twelve. The sense organs supplied by the three cranial nerves belonging exclusively to the nasal chamber are chemical sense organs and function as testing organs for respiratory and alimentary foods. The invasion of the peripheral terminal territory of sensory cranial nerves by newer elements having unrelated origin anatomically and, at most, only a later functional alliance is perhaps unique. It is shown by the distribution of sensory branches of the trigeminus to the epithelial covering of the septum which was originally supplied by the nerves of the chemical senses exclusively. [Author's Abstract.]

Cruchet, R. LETHARGIC ENCEPHALITIS. [Paris Mèd., 9, June 4, 1919.]

The author reports upon forty patients with polioencephalomyelitis seen in nine months and states that lethargic encephalitis, so-called, is but a type of the larger group. None of the cases were influenzal, he believed, and concludes that lethargic encephalitis is probably a syndrome

of various different etiological factors, a conclusion reached by many other observers.

Haden, R. L. CEREBRAL COMPLICATIONS OF MUMPS. [Arch. Int. Med., 23, June, 1919.]

In a series of 476 cases of mumps the author had observed nine in which cerebral complications had occurred. These he diagnoses as encephalitis. Lumbar puncture seemed to be of service.

Sanz, E. F. INFLUENZA AND EPILEPSY. [Siglo Med., 66, 29, March 1, 1919.]

The author's casuistic contributions on the relationships of influenza to nervous disorders have covered a number of these well-known syndromes. He adds to other already published focal involvements, one on focal Jacksonian fits in a young male following an influenza. The left hand alone is involved. Paresthesiæ are first felt, then a sense of tension or more active contractures, and spasms follow. Sanz comments on the possibility of psychogenic monospasms and monoplegias following influenza. He also takes occasion to note the close relationships of lethargic encephalitis to influenza.

Morse, J. L. CONVULSIONS IN CHILDHOOD AND LATER EPILEPSY. [Am. Ped. Soc., June 14-17, J. A. M. A., July 12, 1919.]

This is a study of one hundred and seven persons whose primary complaint was convulsions. No cases were included in which there were any evidences of acute or chronic cerebral disease. The objects of the study were to determine what proportion of the children, otherwise perfectly normal, having convulsions had epilepsy or developed it later, and to find out if there was anything in the history or in the manner of the development of convulsions to show whether or not they were manifestations of epilepsy, or whether they would be followed by or develop epilepsy later. Ten of the children showed spasmophilia. In all these the convulsions ceased, but one of the babies became feeble-minded. It would seem that convulsions which occurred in babies with spasmophilia and which were presumably manifestations of spasmophilia and which were presumably manifestations of spasmophilia were not likely to lead to the development of epilepsy later. In three instances the convulsions occurred in the course of whooping cough, and one of these children developed epilepsy later. Convulsions occurring in the course of whooping cough must, therefore, be regarded seriously. There were thirty-nine cases in which there was a single convulsion at the onset of some acute disease or with an attack of acute indigestion. Two of these children became epileptic and feeble-minded; a third had petit mal, and a fourth might or might not be epileptic. There were fifty-five cases in which there had been repeated convulsions during a considerable period,

and in which there had been repeated attacks suggestive of petit mal. Taking seven years as an arbitrary standard, only twenty-one of these could be considered normal at present. It has been impossible to tell from the nature of the early attacks as to the nature of the attacks when epilepsy develops later. Epilepsy is far more likely to develop when the cause of the attacks is apparently an injury or severe labor, than when the apparent cause is a disturbance in the digestive tract. The longer the attacks have persisted, the more probable is the diagnosis of epilepsy. There is no way to determine immediately when a baby or child has a convulsion, or repeated convulsions, or repeated attacks suggesting petit mal, whether or not it has epilepsy or will develop it later.

Marui, S. CENTRAL NEURITIS. [Am. Arch. Neur. and Psych., 2, July, 1919, J. A. M. A.]

A thorough histopathologic study in two cases of "central neuritis," of Meyer, and many other cases were made by Marui. Almost all the Betz cells in both cases and some cells of the spinal cord of the first case showed the typical axonal reaction; in the first case the fever alteration was superimposed on this picture. Fragmentation of the intracellular neurofibrils was found in the glassy area. The alteration of neurofibrils keeps pace with the dissolution of the Nissl bodies. Besides Marchi degeneration of myelin sheaths, a very interesting picture of axis cylinders was disclosed. Ameboid glia cells showed the Alzheimer fuchsinophil granule, a finding which indicates an increased scavenger activity of the neuroglia tissue. In two cases of central neuritis and many other cases in ameboid and preameboid glia cells, on the one hand, and in case of hemorrhage in granule cells on the other hand, a new "nucleoproteid-like granule" was demonstrated. The author concludes that neuroglia has a constructive function besides a scavenger function, and that this granule is given the neuroglia cells in an afferent direction.

Armitage, F. L. AMEBIC ABSCESS OF THE BRAIN. [Journal of Tropical Medicine and Hygiene, April 15, 1919.]

Armitage reports a case of this uncommon condition, with the results of postmortem pathological examination, and gives a brief summary of the forty-five cases previously recorded in literature. In forty-three of this series, the complication accompanied or followed hepatic abscess. The amebæ, conveyed by the blood, reach the pia mater, where they obliterate the arterioles and form a necrotic infarct, the latter constituting the start of the amebic abscess. There are no distinctive clinical signs of the condition, the manifestations depending upon the localization and the susceptibility of the host. The cephalalgia, coma, and other symptoms are noncharacteristic, and all diagnostic signs may be absent if the abscess develops in the so-called silent area of the brain. The course is rapid and fatal, the duration from the appearance of the headache

being usually from six to eight days, with fifteen days as the maximum. Surgical treatment has been employed in three cases, all of which, however, ended fatally, though in one of Jacob's patients torpor and epileptoid movements disappeared after trephining and drainage of the abscess cavity. Medical treatment is apparently hopeless. The author's case was characterized by marked listlessness and somnolence, cough, incontinence of urine and feces, hiccough, and absence of headache until the day preceding death. The temperature during the last fortnight was usually about 101° F. There were no rigors and no ocular or localizing symptoms. This patient, a New Zealander recently arrived in England, had never been in any country in which amebic dysentery is known to be endemic. The bowel showed no macroscopic dysentery lesions, though cysts of the pathogenic ameba were found in the stools. Treatment with emetine hydrochloride and later with emetine bismuth iodide had no apparent effect on the amebæ of the liver abscess; nor did they prevent the extension of the infection to the brain. Cysts were no longer found in the feces, however, after the treatment with the double iodide. The amebæ of the liver abscess disappeared after irrigation of the abscess cavity with quinine sulphate.

Luzzatti, T. SPASMOPHILIA IN CHILDREN. [Policlinico, 26, June 15, 1919.]

This paper deals with the difficulties in diagnosis of this condition and its many allied convulsive states. Electrical tests are often highly valuable; early neuropathic or psychopathic trends speak for spasmophilia in this differentiation. Chloral and bromides by rectum are recommended in treatment.

Essick, C. R. TRAUMATIC ABSCESS OF BRAIN. [Amer. Arch. Neur. and Psych., 1, June, 1919, J. A. M. A.]

Experimental abscesses produced in the cortex of thirty-five cats by injury and infection of the brain resulted in a rapidly fatal process which stimulated the traumatic injuries of the central nervous system in man. The affected part enlarged and brought about a marked dislocation and compression of the remainder of the nervous tissues. In 50 per cent. of the cases the infection reached the ventricular system within a few days, and from there usually spread into a basilar meningitis through the metapores of the fourth ventricle. The tendency of the infective process to invade the subarachnoid space from the point of injury was not marked, but in a third of the animals the infection entered the subdural space, forming there a subdural abscess. These lesions were very different from the more slowly growing abscesses extending from the air sinuses. The latter, occurring frequently in man, may be differentiated by the relatively slight swelling and dislocation, and by the development of a definite connective tissue capsule between the lesion and the sound

parenchyma. The traumatic abscess in the experimental animal extended rapidly along the fiber tracts. No encapsulation could be demonstrated in any of these observations. Healing took place by ingrowth of connective tissue.

Smith, G. Elliot. THE SIGNIFICANCE OF THE CEREBRAL CORTEX.

In the first of the series of Croonian Lectures on the significance of the cerebral cortex Professor Elliot Smith defined the aim and scope of his task as an attempt to discover how the cerebral cortex acquired its distinctive powers as the organ of intelligence.

Head's researches have provided a new vision of the significance of the brain, and have thrown such a brilliant light into some of the darkest corners of cerebral structure and function as to compel every investigator of the nervous system to re-study the results of his own investigations with the aid of this new illumination. The activity of the thalamus is the physiological process which is expressed in consciousness by a crude awareness to contact, heat, cold, and pain, and the affective aspects, the pleasantness or unpleasantness, of these experiences, whereas the cerebral cortex endows these basic functions with spatial qualities, intensity and relativity. Head's recognition of this fundamental distinction makes it incumbent on those who are investigating the problems of the evolution of the brain to inquire into the means by which the cortex acquired its powers of memory, of discrimination, and of spatial reference. The fact that these epicritic attributes are especially associated with the neopallium, which is found in its fully developed form only in the mammalian brain, suggests an inquiry into the nature of cerebral function in vertebrates other than mammals, and into the circumstances which brought the neopallium into existence.

The cerebral cortex was evolved from that part of the brain which originally was little more than the receptive center for impressions of smell and the instrument for enabling the sense of smell to influence the animal's behavior. Unlike all the other sensory tracts, those which convey impulses from the olfactory organ reach the cerebral cortex directly—that is, without passing through the thalamus. From a psychological point of view, therefore, the sense of smell occupies a unique and distinctive position. It represents the germ of all the higher psychical powers, or, perhaps it would be more accurate to say, the cement that binds together the elements out of which the powers of the cerebral cortex, as the repository of the impressions of past experiences, the organ of discrimination and appreciation of space and time, are developed.

In the primitive vertebrate behavior is dominated by the sense of smell. It is the means by which the animal finds its food and determines its qualities, by which it recognizes friends or enemies, sexual mates or rivals. Smell is possessed of affective qualities which endow it with a direct meaning such as is not associated with either of the other two

"distance receptors" (Sherrington), vision and the eighth-nerve-sense. In the primitive vertebrate living in the water smell is much more nearly akin to taste than it is in man and the land-living animals. When such an animal perceives the odor of food it is really getting a foretaste of the consummation of the reaction, when it captures the food and actually tastes it. Throughout the whole of the anticipatory phase it is under the influence of olfactory sensations, and a series of events, covering the whole period of anticipation and consummation, is linked together by the affective tone of smell into one experience, which includes the germ of memory and of spatial and temporal appreciation. But the sense of smell itself conveys only the vaguest indications of spatial relations. An animal attracted by a scent circles around until it comes within visual range of its quarry; then the eyes convey more precise information as to its position in space and as to its movements. Such visual information is almost entirely devoid of affective tone, of psychological meaning, which it acquires secondarily from the sense of smell. But it is biologically useful, because it enables the creature to steer its course more directly and accurately to the object of the pursuit; and for this reason it is the optic receptive center, the tectum of the mid-brain, which in the primitive vertebrate is put into direct connection with the motor nuclei and directs the movements of the animal. The sense of smell starts the reaction; the sense of sight directs it; the vestibular mechanism (the cerebellum) provides the apparatus for effecting the coördination of muscles without which the orderly movements of the whole body would be impossible.

In the course of the pursuit of its prey, when the animal is led by the sense of smell and is controlled by its dominating affective tone, the information collected by all the other sensory mechanisms is added to and woven into the tissue of the complex experience. Hence these other senses acquire a meaning and a share in the psychical activities which constantly increases in importance throughout the vertebrate series, until it culminates in the vast mental powers of man, in which smell plays a humbler and less obtrusive part, although still one of imperious importance.

Smith, G. Elliott. THE SIGNIFICANCE OF THE CEREBRAL CORTEX. [Br. M. J., July 15, 1919.]

In this fourth Croonian Lecture, Smith says the conditions revealed in the earliest fossil reptiles that have definitely taken the line of development leading toward mammals enable us to draw the inference that the hypopallium (neostriatum) and the neopallium came into existence simultaneously. But in the ancestors of the reptiles at present living the new cortex consisted mainly of hypopallium, whereas mammals cultivated both the new cortical formations. When the hypopallium, bulging into the lateral ventricle, filled up the limited space available in the rep-

tilian brain progress in cerebral development was brought to a sudden stop. In mammals, however, the neopallium, lying upon the surface of the hemisphere, was free to expand and develop those higher attributes which have made it the organ of the highest intelligence.

Both the hypopallium and the neopallium were differentiated to receive the suddenly increased influx of thalamo-cortical fibers which for the first time secured for senses other than smell an adequate representation in the cortex and a correspondingly increased influence over the animal's behavior.

It helps us to understand the mechanism of the neopallium, the true cerebral cortex, if we compare the three cortical formations built up in the fore-, mid-, and hind-brain respectively from the receptive nuclei of the olfactory, optic, and vestibular nerves.

The cerebellum is an overgrown part of the vestibular nucleus; it is a mechanism which enables the effects produced by stimulation of the semicircular canals to be influenced by the conditions existing in all the muscles, joints, and skin areas of the body, so as to coördinate the whole muscular system to perform orderly movements for the purpose of correcting disturbances of equilibrium. But the linking up within the cerebellum of all the mechanisms which receive information from the various muscles and the building up of complex systems of nervous elements makes the organ the instrument for coördinating all complex and extensive movements, irrespective of whether they are concerned with equilibration or not. This cerebellar mechanism is made use of by the mid-brain and the fore-brain to coördinate the muscular actions which they excite.

The tectum of the primitive mid-brain contains nerve cells with widely branching dendrites, which collect into the same channel impulses coming from the eyes, the otic vesicle and lateral line organs, and the sensory nerves of the skin—all bringing information concerning the spatial relations and movements of objects in the outside world. This makes the tectum the great director of the animal's locomotion; and by means of the link established by the red nucleus the tectum can make use of the cerebellar apparatus to coördinate the muscles to perform the actions which it directs.

The primitive cerebral cortex had functions of a very different kind from those of the tectum and the cerebellum. It was originally the organ for appreciating the nature—the attractiveness or unattractiveness—of objects that affected the sense of smell. It was therefore the chief arbiter of the animal's behavior; and the movements which it initiated were directed and coördinated by the tectum and the cerebellum. The architecture of the vertebrate brain was determined by the normal sequence of events in the primitive animal. The creature was led by smell, the organs of which were installed in the fore-brain; directed by vision and the other senses, the instruments of which were connected with the

mid-brain; the resulting movements were coördinated by the cerebellum in the hind-brain; and the consummation of the conscious experience led to the stimulation of the gustatory nuclei in the medulla oblongata, and the initiation of a complex series of unconscious visceral processes.

In the first lecture an attempt was made to explain the nature of the functions performed by the primitive cerebral cortex. It is the instrument by means of which the affective tone of the sense of smell gives coherence to a complicated sequence of events, so that all the incidents in a long and varied series of experiences are united to form part of a consecutive consciousness. Moreover, it provides the germ of the important aspect of consciousness whereby such sensations are projected and referred to happenings in the outside world. Our conceptions of coherence in space and time depend upon the activity of the fully developed cerebral cortex or neopallium.

But the primitive cortex is almost entirely devoid of the means for appreciating spatial relations. It only acquires such powers when the sensory tracts proceeding from the eyes, the vestibular apparatus, the muscles, joints, and skin, convey to it, in adequate degree, the information that is essential for such appreciations, after it has been integrated upon lower physiological levels. The new cortical formations in the Amniota are the expression of these new potentialities. The hypopallium or neostriatum is a crude and imperfect instrument for providing these spatial controls; the neopallium is the more perfect instrument because it provides the means for a fuller development of those physiological dispositions by which discrimination and projection are rendered possible.

When it is realized that the tectum of the mid-brain is the recipient apparatus, not only of visual impulses conveying information as to movements of objects in space, but also of rhythmic wave movements either of water or air, and also of such impulses as ascend for the general sensory nerves, it is not altogether surprising to find that "the loss of power to appreciate serial movements in space is associated with inability to respond to the vibrations of a tuning-fork" (Head).

In the lowlier vertebrates these sensory impulses are integrated on the physiological level of the tectum, so as automatically to regulate movement; but in mammals there is also a psychical integration of such influences, which results from the physiological processes in the neopallium.

The conscious appreciation of succession, both in space and time, is strictly dependent on past events which have left their records in the neopallial mechanism. As Dr. Head expresses it, "every recognizable change in posture enters consciousness already charged with its relation to something which has gone before, and the final product is directly perceived as a measured postural change. This is the case with all the higher projectional aspects of sensation; they form a continuous series of physiological dispositions determined by previous events of a like order."

In the tectum we can study the foundations of the mechanism which makes such physiological dispositions possible. But not until the complex superstructure of the neopallium was added to the brain was it possible for the animal to acquire, in the full measure required for the learning of skilled actions, the conscious recognition of posture and movements, and the possibility of building up the physiological dispositions which, though not accessible to consciousness, are essential for the conscious appreciation of posture and movement.

When the mammalian neopallium acquired this power of appreciating spatial and postural relations it assumed direct control of voluntary movements, and the cerebrospinal or pyramidal tracts and the cerebro-cerebellar connections were established for the first time. The ability to recognize and measure the extent of movements made it possible the more precisely to control and regulate such movements. The acquisition by the neopallium of the power of learning to perform complex skilled actions was possible only because the sensory and visual cortex provided it with the postural information and the physiological dispositions without which such functions were impossible. In the train of these events the animal with a neopallium (more especially the Primates) gradually learned to form ideas of the size, shape, weight and texture of objects and of their position in space.

The influence of the arboreal mode of life in stimulating the attainment of such ability not only in the Primates, but also in the earliest mammals, was discussed.

In conclusion, the lecturer explained that his chief aim in these lectures had been to attempt to discover how the intellectual functions of the cerebral cortex had been acquired. Biologists and physicians in the past had shown a strange reluctance boldly to face the problem that the real functions of the cerebral cortex were of a psychical nature. It is as futile to discuss the significance of the cerebral cortex without considering its intellectual functions as it would be to try to interpret the structure of an aeroplane without reference to the fact that it was meant to fly. Hence in these lectures attention had been concentrated chiefly on the attempt to explain the real work which the cerebral cortex was devised to perform.

Schöppler, H. CYSTICERCUS OF THE BASE OF THE BRAIN. [Münch. med. Woch., 1918, 26.]

The author here briefly reports the findings of the characteristic scalices of *tænia* in a patient who had headache, nausea, vomiting, dizziness, marked lethargy and some mental disturbance. A clear to pellucid yellowish walnut sized cyst was found at the cerebello-cerebral angle. [J.]

Pastore, M. CHOREA TREATED BY MAGNESIUM SULPHATE. [Pediatria, Oct., 1918. J. A. M. A.]

Pastore reviews the literature on the treatment of chronic chorea by intraspinal injection of magnesium sulphate according to Marinesco's technic. Excellent results have been reported by a few but in Caronia's case there were extremely severe by-effects, the child collapsing at once after the injection, with paralysis of all the muscles and unconsciousness, respiration becoming rare, with pauses, and only the heart beat showing signs of life, the temperature dropping to 35 C. Artificial respiration was kept up systematically for about twenty-four hours, with continuous inhalation of oxygen, and the child recovered. There were no further manifestations of the chorea from immediately after the injection. Pastore here reports four cases in which the magnesium sulphate was given in small repeated doses, thus curing the chorea without danger. She made from five to seven intraspinal injections of from 0.1 to 0.2 gm. of magnesium sulphate in a 25 per cent. solution, to a total of 0.4 or 0.5 gm. The intervals were one or two days at first, and three or seven days toward the last. There was no appreciable reaction, and improvement was pronounced after the third injection in one child; after the sixth or seventh in two others. One child was not completely cured, although notably improved by the treatment. In this girl of 11, the third injection was followed for two days by intense headache, superficial respiration and sluggish pupil reactions, and the choreic movements returned, but improvement was pronounced under two more injections of the sulphate.

Brown, A., Smith, G. E., and Phillips, J. G. AUTOSERUM TREATMENT OF CHOREA. [British Journal of Children's Diseases, January-March, 1919.]

These authors report the use of this method in twenty-three cases of chorea of which seventeen were mild and five severe. After one year and a half of observation seventy-seven per cent. of the patients were cured, nineteen per cent. improved, and only one patient unimproved, who refused further treatment on account of a severe reaction. The average number of injections given was three, but several patients were given only one, and one received five; the average amount of serum employed was seventeen c.c. Nineteen patients were cured in three weeks and four in one week. The authors sum up their results as follows: (1) The method has given infinitely better results than any other form of treatment; (2) the technic is so simple that it may be employed in any home or out patient department under mild anesthesia; (3) with the observance of proper precautions the reactions were negligible; (4) there were no recurrences in a period of one year and a half. The technic consisted in withdrawing about fifty c.c. of blood from the median basilic vein into three test tubes. After clotting, the tubes are

put into the centrifuge for thirty to forty minutes, after which time the serum is pipetted off and put into the incubator to keep at the proper temperature for injection. Twenty to twenty-five c.c. of cerebrospinal fluid are withdrawn by lumbar puncture and the serum gradually introduced through a Record syringe, taking care to avoid too great pressure. It was found that light anesthesia with ethyl chloride enabled the operator to estimate the resistance which is the guide to the quantity to be injected. The method is based upon the hypothesis that there are antibodies circulating in the blood which are inimical to the infecting organism of chorea and that these antibodies cannot come in contact with the organisms in the spinal canal on account of the choroid plexus. These antibodies are by this intraspinal method placed in contact with the bacteria.

Grossman, M. THE MALONEY METHOD OF REEDUCATION IN THE TREATMENT OF CHOREA. [N. Y. Med J., May 17, 1919. Med. Rec.]

Grossman points out that for a clear understanding of the clinical entity known as chorea, which is more frequent in girls than in boys in the proportion of three to one, it is essential to limit the application of the term to a disturbance of the central nervous system characterized by sudden, rapid, widespread, seemingly involuntary movements, devoid of outward purpose, yet not wholly beyond the control of the will, and aggravated in excited, and moderated in tranquil states. The term minor chorea should be applied only to cases in which, with or without the occurrence of an infectious process or of an emotional crisis, these characteristic movements spontaneously begin, gradually becoming more conspicuous. There seem to be two types; one in which infection and emotional accidents are blamed, the other in which these factors are not implicated. There are also two types of patients; those who before the disease were notably restless and excitable, and those who did not differ markedly from the average child. In the latter, onset of the disease can often be traced to some infection; whereas in the former the disease more often dates from some emotional stress. Physical examination as a rule does not reveal any great change in the size of the muscles, although the tone may be slightly diminished. Superficial reflexes are usually present and sometimes unusually active on both sides; deep reflexes are normal as a rule, and sensation undisturbed. Pathologically neither gross nor microscopic lesions have been found in a sufficient number of cases to afford a definite structural foundation for the symptoms. The bacteriological findings suggest a clinical phenomenon resulting from the action of a bacterial toxin upon the cortical tissues. It would seem from evidence available that there is no distinct causal relationship between rheumatism, endocarditis, and chorea; there is, however, a close association in about 20 to 25 per cent. of cases. *Treatment*: Patient should be confined to bed during the acute stage. All

mental and intellectual efforts should be avoided, and all emotional influences shunned. A competent nurse and a well ventilated room are of value, with bland diet and hydrotherapy in the form of tepid douches or packs. In severe cases continuous warm or tepid packs are of great benefit in soothing the patient. Bowels should be kept open and a mild saline given if necessary. A thorough course of salicylates should be given in cases with a rheumatic history; aspirin or salicylate of soda up to five-grain doses with ten grains of bicarbonate of soda should be given every four hours to a child of ten. If there is no history of rheumatism, arsenic in the form of Fowler's solution (diluted with half its bulk of distilled water in the case of a child of ten), or Donovan's solution may be given. The urine should be closely watched for albumin; diarrhea or puffiness of the eyes should be followed by immediate reduction of the arsenic or its temporary discontinuance. In cases with marked motor unrest, bromides in five-grain doses every four hours may be given by mouth. Salvarsan and neosalvarsan have been advocated on the assumption that chorea was a manifestation of syphilis; the author, however, believes that in the small proportion of cases in which syphilis was present, it was merely a coincidental condition. The subcutaneous injection of magnesium sulphate solution, the intravenous injection of dilute phenol solution, and the intraspinal injection of auto-serum have all been tried. The author has found the rest or relaxation exercises described by Maloney of value in quieting the patient during the acute febrile period. The diaphragmatic breathing is of great value in inducing relaxation of the muscles. The patient is asked to take a deep breath using his diaphragm, restricting his thoracic movements, and at the height of inspiration to pause, then slowly and evenly expire, and again pause. This breathing soon tires the patient, so after ten or twelve of these deep respirations have been taken, the depth of inspiration and the pause are shortened until the patient is breathing, without effort, as in sleep. To relax the muscles, passive movements in which the muscles are alternately lengthened and shortened are employed. The muscles of the forehead, cheek, and jaw are manipulated until wrinkling of the forehead and blinking of eyelids disappear and the muscular spasm is eliminated. Next a shoulder is relaxed, then an arm, a leg, and so on. After a part is relaxed, the parts previously treated should be briefly dealt with again in the order in which they were first relaxed. This is helpful in bringing the entire body into a state of relaxation. During the passive movements, the patient's attention should be directed to the control of the choreic twitchings; gradually this requires less and less effort, and soon complete and perfect relaxation is possible. When the temperature and pulse have been normal for several days and the limbs can be freely moved passively without rigidity or spasm, active movements may be begun. Simple movements—flexion, extension, adduction, and abduction of joints—should be regulated by a metronome.

The patient next resists the movement, in order to increase the ability to maintain tonic contraction; and finally the movement is made against the resistance of the operator. When the patient is able, in the recumbent position, to perform normal movements, reëducation in maintaining the normal attitude may be commenced. Creeping on hands and knees, balancing and creeping on knees, and finally maintaining an erect attitude and progression. Changes should be made gradually and fatigue avoided, and rest exercises should be given alternately with active work. Toys and games are useful in helping patients to regain precision of movement; they also interest and amuse the patient. The aim of these exercises is to encourage freedom as well as precision of movement; incoördination is corrected and concentration with increased mental stability is thus promoted.

7. NEUROSYPHILIS.

Aimes, J. SYPHILITIC POTT'S DISEASE. [Paris Med., 9, June 14, 1919.]

The differentiation of tuberculous from syphilitic spinal caries is here taken up, since mistakes are apt to occur in that all cases are thought to be tuberculous. Males seem affected in the majority of the cases, and the usual site is in the cervical spine. The pain of tuberculous caries is usually relieved by rest, that of syphilitic caries rarely.

Shmookler, H. B., and Rubenstone, A. I. SPIROCHÆTA PALLIDA IN NERVE TISSUE IN PARESIS. [N. Y. Med. Jl., July 19, 1919.]

The histological structures in tissue preparations for demonstration of spirochæta pallida offer no impediment in making out the morphology of the organisms except in nerve tissues. Here the observer is confronted with a maze of fibrils that so closely simulate the spirochæta, both in ability to take the stain and morphologically that at times it is difficult and sometimes impossible to differentiate them. Because of previous experience with this class of tissue a method of dark field illumination was used. A case of paresis was particularly suitable for this method of examination.

Autopsy was performed about an hour after death and the following was noted: The brain and cord were immediately removed to the laboratory and by means of dark field illumination a few spirochæta pallida were demonstrated in the cortex of the frontal, frontoparietal regions, and in the pons as well as the meninges, but only after prolonged search in the latter. As the brain tissue cooled it was more and more difficult to demonstrate organisms, until four hours after death it was utterly impossible. No organisms were demonstrable in the spinal cord and cerebellum. To obtain clear preparations of cortical tissues for dark field illumination it is essential that the fresh smear from the cut surface of the cortex be mixed with a drop of sterile physiological saline

solution. Inoculation into rabbit testes was made from the fresh material, but the animal was lost due to an intercurrent infection.

After prolonged search on Levaditi of many sections some organisms were discovered, but owing to the great difficulty in differentiating between the other structures that simulate spirochæta, these findings would have been of doubtful value without the first dark field observations. The routine hematoxylin eosin preparations showed not only atrophic changes in cortical cells, but diffuse infiltration with small lymphocytes, with increased amount of fibrous thickening and adhesions of meninges to the cortex. As far as the writers know no one has described this method of demonstrating spirochæta pallida in fresh nerve tissues before, and they hope that it may be of aid to others, lightening their burden in their search for the organisms in syphilis of the nerve system.

Rusca, C. L. WASSERMANN REACTION WITH HUMAN MILK. [*Pediatrics*, 27, June, 1919.]

This examination of the breast milk of forty women, fifteen of whom were non-syphilitic and sixteen syphilitic, showed negative results in the non-syphilitic, save a weak reaction in the colostrum. In the syphilitic women the Bordet-Wassermann reaction was uniformly positive and under treatment reacted similarly to the blood. This observation offers a fertile field for study and also provides a means of diagnosis in suspected cases without attracting suspicion, if secrecy seems essential, or when there is a resistance to the examination of the blood.

Laederich, L., and Bory, L. WASSERMANN REACTION IN ERUPTIVE DISEASES. [*Bull. Soc. Med. Hop.*, 43, May 23, 1919.]

In 20 cases of scarlet fever, 4 of smallpox and 13 of measles positive though milder reactions were obtained within two weeks of the time of the infection.

Thomas, B. K. FIXATION TEST IN SYPHILIS. [*N. Y. M. J.*, June 21, 1919, *J. A. M. A.*]

Thomas points out that valuable modifications to the hemolytic system of the homocomplement method are pooling serum for the determination of the hemolytic unit, the use of a light cell suspension, and finally taking as the hemolytic unit that amount of amboceptor which completes hemolysis in fifteen minutes rather than in twenty-five minutes. In the test itself, the use of pooled acetone insoluble antigens is of paramount importance, because the antigen is the keystone reagent in this as in every other complement fixation test. The most valuable change in the technic of the test is the substitution of cold for heat fixation. This has not been the experience of some other workers, but this difference may be explained by the increased period of fixation adopted by Thomas. The use of serum with a complement content of variable quantity is

theoretically not a part of an ideal system, but practically the influence of this variation is of little importance, because active serum in moderately large amounts are used. In the great majority of instances with such amounts more than enough specific antibody is present to deviate all of the complement with the routine antigen excess. Noguchi has shown that unheated syphilitic serum from an active syphilitic patient contains one antibody fixing unit to every 0.008 c.c. of serum. Therefore, 0.2 c.c. of this patient's serum would contain twelve antibody fixing units. In addition, although syphilitic serum in the majority of instances contains active complement, there are fewer specimens from syphilitic with a hypercomplementary activity than from nonsyphilitics. These two properties of specific serum reduce the possibility of error from hypercomplementosis.

Thompson, J. G., and Mills, C. H. MALARIA AND WASSERMANN REACTION. [Lancet, May 10, 1919.]

This paper reviews the literature of the determination of the Wassermann reaction in the presence of malaria and divide the results into four groups. The first group includes records of those who found the reaction positive when malaria parasites were present in the blood, and generally for some weeks after they had been made to disappear by treatment with quinine; the second, records of positive reactions only when the parasites were present in the blood; the third, positive reactions only when there was a febrile paroxysm and then rarely; the fourth, universally negative reactions in malaria. An unsatisfactory technic for the reaction and undiagnosed syphilis account for the results in the first two groups. The authors then record the results of their own investigations, using the standard technic for the full Wassermann test in 130 cases of malaria, representing every possible stage of the disease. In only eight cases was the reaction positive, and syphilitic infection could be diagnosed positively in each of these cases. They therefore conclude that malarial infection never causes a positive reaction, irrespective of the stage of the disease. They also discuss the frequent difficulty of diagnosing obscure cases of acquired or congenital syphilis and emphasize the fact that they may readily be overlooked unless great care is observed. They state that the occurrence of a positive Wassermann reaction in a case of malaria is due either to the presence of syphilitic infection or to the use of faulty technic.

Darling, Ira A. NEUROSYPHILIS OF THE PARETIC TYPE: CRITICAL EXAMINATION OF DOUBTFUL CASES. [Am. Jour. of Syphilis, Vol. III, No. 1, Jan., 1919.]

The average case of general paralysis of the insane is not difficult to diagnose but there are a few atypical cases that will escape proper classification if the physician does not make use of all his knowledge and of

all the modern aids to diagnosis. This paper gives abstracts of thirteen case histories, taken from the records of the Warren State Hospital, illustrating this point and the author endeavors to locate a few of the common sources of error.

The diseases found to be most frequently confused with paresis are toxic insanity (secondary to heart and kidney diseases, diabetes, and alcohol), dementia præcox, and arteriosclerotic insanity. The mental and physical symptoms of the foregoing conditions, particularly when complicated by systematic syphilis, may closely simulate paresis and the recognition of the true underlying factor depends almost entirely upon the laboratory proof of the presence or absence of syphilis of the central nervous system. This being true, it becomes necessary to exercise great care in interpreting the laboratory tests and in choosing the laboratory that makes them. In addition one must be sure to test several specimens of both the blood and the spinal fluid. No more common, and inexcusable, source of error exists than reliance upon one examination of the blood and the spinal fluid, or worse yet one test of the blood only. The use of the Wassermann test with the blood and of the Wassermann and colloidal gold tests with the spinal fluid (being sure to test several specimens of each) and the interpretation of the results obtained by associating them with complete clinical data will reduce the error in diagnosis to a very small figure.

It is found that all cases with symptoms resembling paresis but associated with nephritis, diabetes, failure of cardiac compensation, or prolonged alcoholism must be studied very carefully before being finally classified as paresis. One case presented in the paper illustrates paresis complicated by diabetes mellitus and another diabetes mellitus with mental symptoms and physical signs resembling paresis. The final diagnosis in each of these cases was proved at autopsy. Two other cases presented have serologic evidence of syphilis with both the blood and the spinal fluid but the mental and physical symptoms are not of the neurosyphilitic type. Both of these patients had mild, transient mental disturbance. They returned home and now, five years after their discharge from the hospital, are living comfortably and showing no mental abnormality that is recognized as such by their respective families. These cases are listed as "paresis sine paresi" or incipient paresis.

The combination of speech disorder, pupillary changes, reflex changes, amnesia, quick-shifting emotions, character change, and conduct slump was observed in all the paretics reported except one, who was in such a feeble, demented condition when brought under observation that no satisfactory examination could be made. These symptoms, when accompanied by laboratory evidence of syphilis on examination of the spinal fluid, may be considered as typical of general paralysis of the insane. The Wassermann reaction with the blood cannot be considered as being of much aid in the diagnosis of neurosyphilis when attempting to differentiate that disease from others. [Author's Abstract.]

Goodwin, G. M. ARSPHENAMINE IN NEUROSYPHILIS. [Am. Arch. Neur. and Psych., 2, July, 1919, J. A. M. A.]

In this series of twenty-one cases, 214 intraspinal treatments were given by Goodwin and Scott. Severe reactions have occurred, but no permanent injury or ill effects resulted from the intraspinal use of auto-arsphenamized serum. The treatment has uniformly been of benefit in its effect of increasing the patients' comfort by lessening the severity and frequency of their pains, in frequently improving bladder control, and in improving their nutrition. Improvement in station and in gait has frequently been observed in these cases, and in some, to a very marked extent.

Galliot, A. INHERITED SYPHILIS AND TABES. [Paris Med., 9, June 9, 1919.]

Two case histories in which the patients developed tabes at 29 and 36 years of age, respectively, without any antecedent signs suggestive of inherited syphilis; save in one patient there had been unequal pupils since childhood. Both patients had been severely stressed in the war and the tabes developed at this period of surmenage.

Schaller, W. F. PATHOGENESIS OF TABES. [Am. Arch. Neur. and Psych., 1, June, 1919, J. A. M. A.]

Schaller is an adherent to the meningeal theory of tabes in the sense that the meningeal inflammation occasions in some manner the characteristic degenerations of the posterior roots and the posterior columns of the cord. Subacute syphilitic inflammatory changes in the subarachnoid space (posterior leptomeningitis, meningeal and neural involvement of radicular nerve) are in etiologic relationship with the degeneration of the posterior roots. Likewise similar processes explain the cranial nerve involvement in tabes. The manner in which this subacute inflammatory meningitis produces root degeneration is as yet uncertain. It may act by direct extension of the meningeal lesions to the nerve roots causing a meningo-radiculitis, or by pressure constriction from sclerosed meninges; by toxic products engendered by this inflammation or even by increase of fluid pressure, as in the case in posterior spinal root degeneration in brain tumor. These causes may act together or independently. This inflammation, which is constant in tabes to a greater or lesser degree, is evidenced by characteristic cerebrospinal fluid changes at one time or another in every case of tabes. Specific therapy in tabes should have for its object the reappearance of normal fluid reactions. Intraspinal therapy may be necessary to obtain this object. Conversely intraspinal treatment is contraindicated when the fluid shows no inflammatory reactions.

Sanz, E. F. TABES AND PARESIS. [Siglo Méd., 66, June 7, 1919.]

This paper recommends the use of mercury cyanide as a useful adjunct to the intraspinal use of salvarsanized serum. He advises its intravenous use. In tabes the results, he holds, have been fruitful, but as for paresis no signal success has yet been observed, although he maintains a definitely hopeful attitude towards ultimate control in this syphilitic trend.

Sands, I. J. INTRAVENTRICULAR TREATMENT OF PARESIS. [Am. Arch. Neur. and Psych., 2, July, 1919, J. A. M. A.]

Sands claims that this is the first case which has received this form of therapy and has been studied clinically as well as at the postmortem. The patient was a man, aged 40, who had one living child, a negative family history, but an alcoholic personal history, who had no knowledge of any venereal disease. He began to show lapses of memory in December, 1915, which increased in severity so that he was obliged to discontinue his work in the middle of 1916; he then became irritable, showed speech defect and became ataxic; in March, 1917, he received one intraventricular injection of arsphenamin through a trephined opening in the skull. May, 1917, he showed disorientation, poor memory, expressed grandiose ideas; showed marked speech defect, pupils were unequal and reacted very sluggishly to light, and the spinal fluid showed positive globulin, fifty-four cells, and a positive Wassermann reaction. He soon began to soil himself, became very euphoric and died following a convulsion. The postmortem examination showed the characteristic lesions of general paralysis in the brain: namely, a thickened pia showing a characteristic milky exudate in the anterior two thirds, atrophy of the anterior poles of the cortex, lymphoid and plasma cells infiltration into the pia, neuroglia increases, cortical disorganization and perivascular exudation of lymphoid and plasma cells, many mast cells and a few rod cells, granulations on the floor of the ventricles, syphilitic aortitis and bilateral bronchopneumonia and pulmonary edema; the lesions in the left side of the brain which received the arsphenamin were more intense than those on the right side.

Hanser, A. VISCERAL ANALGESIA IN TABETICS. [Deut. med. Woch., 1919, No. 5.]

The author describes a tabetic of 45 years of age in whom there was an ulcer of the duodenum with perforation with resulting peritonitis and collection of feces and gas in the peritoneal cavity. The patient had no discomfort and was unaware that anything was wrong save for nausea. He compares this case with analogous cases in literature.

Lavergne. INHERITED SYPHILIS AND LATENT MENINGITIS. [Le Nourrisson, 7, May, 1919.]

Systematic lumbar puncture examinations in infants often reveal the syphilitic nature of meningeal symptoms and suggest the proper treatment.

Touraine, A. SYPHILITIC VITILIGO. [Paris Méd., 9, June 7, 1919.]

Vitiligo is often a syphilitic stigma and every individual so affected should have serum examinations of blood-fluid. Thirty-nine cases of nervous disorders, including hemiplegia and tabes, were observed by him in the course of vitiligo. Twenty-four of 37 patients showed spinal fluid changes; 81.1 per cent. proved to be syphilitic. A syphilitic radiculitis seems to lie at the foundation of the vitiligo trophic disturbances.

Jeans, C. P. CEREBROSPINAL EXAMINATION IN HEREDITARY SYPHILIS. [Am. Pediat. Soc., June 16, 1919, J. A. M. A.]

About 30 per cent. of syphilitic infants show changes in the cerebrospinal fluid of such a character and degree as to make the diagnosis of syphilitic involvement of the nervous system quite certain. There may or may not be associated clinical manifestations indicating neurosyphilis. Intravenous and intramuscular treatment will result in most instances in the disappearance of the abnormal findings, both in the cerebrospinal fluid and in the blood. Routine spinal puncture in older children having either latent or active syphilis likewise showed evidence of neurosyphilis in about 30 per cent. of those examined. Prolonged intravenous or intramuscular treatment will eventually result in a negative blood Wassermann reaction, while the cerebrospinal fluid may or may not continue to show changes indicating neurosyphilis. Intraspinal treatment will cause the disappearance of pathologic changes in the spinal fluid when these have persisted.

Parody, R. E. INHERITED NEUROSYPHILIS. [Preusa Med Arg., 9, April 30, 1919.]

Symptoms of spasm of the glottis had been present since two years of age in a boy of nine, at which age he had severe spasmodic asthmatic cough, some hemophilia and marked horse serum anaphylaxis. He then had meningeal signs. Mercurial treatment cleared up the entire situation.

III. NEUROSES, PSYCHONEUROSES, PSYCHOSES

1. NEUROSES, PSYCHONEUROSES.

Cruchet, R. HYSTERIA AND WAR INDEMNITY. [Jour. de Méd. de Bordeaux, April 25, 1919.]

This paper deals with the military adjustment of these cases which, the author says, does not differ essentially from the industrial aspect.

The question of indemnity is excellent to bring out the distinction between actual disease and simulation. Charcot was the first to demonstrate that hysteria was a true disease, corresponding in some degree to possession, and quite distinct from simulation. But with the advance of psychoneurology it was seen that distinction was often impossible and finally Babinski decided against making any distinction in practice. The term hysteria, according to him, should be reserved for the actual manifestations commonly known by that name, such as contractures, paralyses, anesthetics, and various forms of seizures. Simulation is a word of considerable range and it is not necessary to consider the motivation, whether unconscious or conscious. Cruchet makes a distinction between unconscious simulation (such as imitation), perseveration, exaggeration, and that which is termed hysteria proper.

Müller, L. R. BLADDER NEUROSES IN WAR. [Münch. m. Woch., 1918, 28.]

Two types are here emphasized as occurring in the soldiers. (I) Permanent infantile type. These patients have always wet their beds and almost always have shown numerous signs of organ inferiority. Cystoscopic examination showed in the majority of these cases a muscular swelling, diverticular like in the anterior bladder wall, sometimes completely encircling the bladder. To this same group also may be added those childhood bed wetters, who had overcome the satisfaction of the impulse, but who resumed the practice under the severities of military service. Anatomical study showed a similar type of bladder construction. A second group is set apart as developing in those who had had no special enuretic history of childhood but who, under prolonged influences of cold, developed pollakisuria and later nocturnal bed wetting and even loss of control of the bladder during the daytime. This refrigeratory type, as Müller would call them, showed no such muscular anomalies but all had marked hypertonia and increased reflex irritability of the bladder. [Cause not suggested by the author.]

Frank, L. PSYCHOANALYSIS FOR CHILDREN. [Corresp. b. f. Schw. Aerzte, 49, May 19, 1919, J. A. M. A.]

Frank illustrates by a number of concrete examples the imperative necessity for seeking out the cause when children become irritable and display anger and hatred for the ones they really love best. Psychoanalysis may give the clue, and change of scene to a sympathetic environment may ward off irreparable injury, and save the child from a criminal career. The question is, where can such children be sent where they will get the patience and affection they require, in wholesome surroundings, with other children? A temporary change from the paternal roof is so indispensable that Frank declines to take any such case unless this is arranged. In conclusion he emphasizes the internal conflicts to

which illegitimate children are so often exposed. The more intelligent the child, the more keenly he feels his ostracism and resents the prejudices of society. It is not a casual coincidence that so many professional criminals are of illegitimate birth. Frank says further that the psychobiologic phase of the subject of the declining birth rate never gets mentioned in scientific discussions. Even physicians are not qualified to discuss it as their university training leaves out of account altogether the important normal and pathologic psychic manifestations of the reproductive functions. And yet, he asks, "Are not these psychic processes the axis on which our entire human life revolves, its happiness and its unhappiness? Are these forces actually imponderables for the physician? A correct understanding of human biology leads inevitably to the conclusion that man can live a healthy and happy life only when he is not fighting like a Don Quixote against the forces working in him, the gregarious instinct and the longing to love and be loved. . . ." "The university courses in medicine, law, theology and pedagogy, although the professions they teach have to deal always with man and his relations with his environment, yet pass over entirely the normal or pathologic life of sentiment and sex relations in general."

Winslow, P. V. PSYCHOGENIC APHONIA. [N. Y. Med. Jl., June 28, 1919.]

The author first presents a brief analysis of the speech mechanism, which he writes is highly complex, composed of the air tract, cords, resonating chambers, muscles, mucous membrane, tongue, teeth, hard and soft palate, anterior and posterior pillars, and the lips, all synthesized by vegetative and cerebrospinal nerves. The larynx is the most important part of mechanism and respiration and phonation are its chief functions. The author points out that with any lesion or disease in the body paralysis of the abductor muscles is organic; on the other hand, when the adductor muscles are primarily affected, the paralysis is functional and not organic. It is therefore comparatively easy to distinguish between an organic and a functional aphonia. In the functional loss of voice, hysteria is the principal cause and occurs chiefly in young women, sometimes in girls as young as eight years. General weakness, anemia, neuropathic disposition, and inflammation of the larynx are predisposing factors. Any sudden emotion, fright, mental or physical shock, exposure to incessant gun fire and gruesome sights, great joy or grief, are all important causes of this condition, which is naturally more likely to develop in neurotic individuals. In hysterical mutism, the patient cannot even whisper, the condition being one of aggravated functional aphonia combined with paralysis of the whole speech mechanism. In hysterical cases, the onset is usually sudden and speech is reduced to a whisper; in cases due to general or local weakness, the onset is more gradual. Winslow draws attention to the necessity of a thorough examination of

the larynx in such cases, as the condition is frequently diagnosed as acute laryngitis and if it persists it is often called chronic laryngitis. He cites a number of cases which have come under his observation and outlines his method of treatment, which is as follows: The patient is seated before the observer and a careful history of the case is taken. A careful examination is then made of the larynx with the laryngeal mirror and the movements of the vocal cords and condition of the mucous membrane from the larynx down as far as can be seen are noted. If the case is one of functional aphonia, the mirror is removed and the patient is asked to take ten or twelve deep breaths, and then to raise the arms above the head ten or twelve times. Then, looking the patient directly in the eye, the observer tells him there is a little piece of cartilage in his throat which is slightly out of position and as soon as the observer puts his finger down his throat and fixes it, he will be able to speak. Then standing to right of patient with his left arm around patient's neck, the index finger of left hand pushing in the cheek between upper and lower jaw to prevent patient from biting, the observer pushes index finger of right hand down throat of patient beyond the epiglottis and holds it there until patient makes an attempt to get away. He continues to hold finger there until it begins to get uncomfortable, when the patient will, as a rule, make a sound like a grunt. Observer then takes his finger away and begins to count from one to five, urging patient to count with him. If this does not work, he repeats the count much louder than before, and it may be necessary to yell before the patient begins to use his voice. When the voice is restored, the author states that he keeps it working for some time so that the patient will become accustomed to it. He adds that the attitude of the operator must be firm but gentle and he must inspire the patient with confidence in his power to restore the voice.

Nolen, W. HEALING MIRACLES. [Ned. Tijds. v. Geneesk., 1, April 26, 1919.]

The case of a woman 44 years of age is detailed who was totally paralyzed for ten months after three years gradual onset. At a sanatorium she recovered the use of her legs, but on returning home the paralysis returned. She had to be fed, and even turned in bed. By constant working with her a complete recovery was made. She had a psychogenic palsy and her recovery was a banal illustration of what is constantly being observed by those working with psychoneurotics. This address contains little that is noteworthy and much that is well known but continually forgotten.

Pollock, H. L. SPHENOPALATINE NEUROSES. [J. A. M. A., Aug. 23, 1919.]

Pollock considers that disorders of the sphenopalatine ganglion are not attributed the importance which they deserve. To understand the

etiology of these neuroses, a fair conception is necessary, he says, of the anatomic relationship of the ganglion to the accessory sinuses of the nose. He therefore gives a rather detailed account of these anatomic conditions and their relations. Judging from the close relationship of the ganglion to the accessory sinuses one cannot but believe that an inflammation or suppuration in these regions must at times involve the ganglion itself and give rise to the neurosis often observed. "The neuralgic syndrome consists of pain, intense and excruciating in character (in some cases of milder variety), radiating to any or all points supplied by branches of the ganglion. The typical location of pain is over the root of the nose, in and about the eyes, over the frontal region into the pharynx and tonsil region, in and around the ear, posterior to the mastoid, into the occiput, to the neck, the shoulder, the arm and, at times, even to the fingers. The most severe and constant pain seems to concentrate at a point about 6 mm. back of the mastoid. Not all patients present this typical picture, as usually only one or more of the points named are involved; but I have seen a few cases in which all of them were affected at the same time. In practically all of these types of cases, the pain just posterior to the tip of the mastoid is present." With this clinical picture, the diagnosis is simple. Local points of irritation, such as the teeth, gums, deflected septum or spurs, must be searched for before an attempt is made to affect the ganglion itself. Pollock has described the sympathetic syndrome before. It may come on at any time of the year, and is in no way associated with the various pollens of hay-fever, though inhalations of special perfumes may produce the paroxysms. His previous description is reproduced. It is difficult to explain why some cases are neuralgic and others of the sympathetic type. The prognosis of these neuroses is bad if they are let alone, and the brilliant results obtained in the neuralgic type are not often achieved in the other. Alcoholic injections may relieve temporarily. Pollock describes his prognostic method of using cocain applications in the region of the sphenopalatine foramen. If this stops or ameliorates the pain to any great extent, we can be reasonably positive that injection of the ganglion will have good results. On account of the simplicity of the injection and its freedom from danger, it ought to be tried out in every case, and if only temporary results are obtained, so much is gained, and it can be repeated with probably less danger than before.

Dillon, F. THE NATURE OF SHELL SHOCK. [Bulletin of the Canadian Army Medical Corps, Sept., 1918.]

The author speaks of the diversity of opinion regarding the nature and origin of shell shock, which has been, since the outbreak of the war, attributed to neurological or mental disorders, or to a combination of both. He rejects the first and last suggestion and concludes that it is due to purely psychological troubles, explaining his views as follows:

The neurological hypothesis is untenable owing to: (1) the lack of direct evidence for the existence of an organic basis; (2) the sudden disappearance and mutability of symptoms; (3) the effect of psychological treatment in curing and ameliorating the symptoms; (4) the occurrence of precisely similar symptoms in men who had never been subjected to any exposure liable to cause organic damage.

The psychological explanation is found in the very nature of man. In every normal individual there is a latent tendency toward the arousal of certain emotions by certain stimuli. These emotions, which find their origin in man's instincts,—the combative, social, repulsive, fearful, etc.,—tend, when aroused, to produce their characteristic effects. They are, on the other hand, counterbalanced by a more or less considerable amount of power of resistance. Under the long-continued strain of modern warfare, the reserves of mental energy gradually become exhausted. The balance is disturbed at a given moment, and an unexpected shock, *i.e.*, a sudden inrush of the emotion-arousing stimulus, may cause a breakdown. The commonest form of war psychoneurosis is the "*névrose d'effroi*," the symptoms of which are: headache, giddiness, mental confusion, visceral disorders, etc.; other forms show paralyses, contractures, etc.; a third class consists of cases of complete amnesia and fugues; a fourth group which may be called the "conversion" class, consists of cases in which the psychical trauma is converted into bodily symptoms; the fifth and last class is made up of combined types, including, first, cases showing the symptoms of both neurological and psychoneurotic troubles; second, of war psychoneurosis which has developed in conjunction with preëxisting psychoneurosis.

Prognosis and Treatment. Shell shock, when treated with proper understanding, is, in the large majority of cases, not a serious condition. Seventy per cent. of the cases treated at advanced centers in France are made fit to return to duty.

The main principles of the treatment may be summarized as follows. The atmosphere of the wards should be one of understanding and of cure; an attitude of rational firmness must be maintained toward the patient from the outset; and the chief problem is to effect the rearrangement of the disorganized mental activities and to bring the conflicting forces in the mind into a state of equilibrium. This can be carried out by means of a system of mental analysis and individual reëducation.

Lhermitte, J. EXHIBITIONISM IN WAR NEUROSES. [*Progrès Méd.*, 34, May 24, 1919.]

Ostentatious display of the results of war injuries is one of the by-products of the recent world cataclysm. The author has coined a new term for it, *pathodixia*, but without contributing much to its inner significance. The initial emotional phase, he states, is followed by a phase of hypochondriac uneasiness and this finally settles into automatic stereo-

typed attitude. In many respects it shows ambivalent symptoms to Babinski's group of anosognosias, in which the *belle indifference* of many hysterics is manifest.

Yealland, L. R. PSYCHOGENIC VISUAL DISORDERS. [Br. Jl. Ophth., Nov., 1918.]

Visual disturbances are the least common of hysterical manifestations, according to this author. They may be divided into two classes: (1) those in which the contraction of antagonists may be demonstrated; (2) those in which contraction of antagonists cannot be demonstrated. Blepharospasm is a typical example of the first class. Failure of vision is due to the inability the patient experiences in attempting to open the eyes. Instead of the orbicularis relaxing, it contracts and overmasters the levator and the eyes remain shut. The patient is seated six meters from a vision card and a faradic current applied to the closed lid until he can open it and read 60. The treatment is continued, possibly for an hour, till he reads 6. Ptosis is treated in the same manner. Spasm of accommodation may be included in this first group if the suspensory ligament is regarded as the antagonist of the ciliary muscle. The faradic current is employed to reëducate the patient to see near and distant objects. The patient is made to read letters on the vision card first at six meters; the card is then brought closer and closer to the patient, and when read correctly is brought back again to its former distance. Class II includes limitation of the fields of vision and embyopia. The use of Bjerrum's screen readily shows inconsistencies in the patient's fields. Faradism during field testing results in cure. Amblyopia by itself is very rare, and in the author's experience always monocular. If unattended by other signs of hysteria, it is probably simulated, he believes.

Vignolo-Lutati, C. PRECOCIOUS CANITIES AND WAR PSYCHOPATHY. [Policlinico, 1918, 25, 680-685.]

Records nervous cases of total, regional, unilateral and other canities following soon after long mental and psychical strain and usually permanent. Frequent precursors were obstinate headache and neuralgia.

Charlier, J. CANITIES OF NERVOUS ORIGIN. [Prog. med., 1918, 210-211.]

Canities of one side, loss of corneal sensation on one side and of the reflex of the cornea developed in the case of one soldier, aged 24, after a wound in the left parietal region.

Book Reviews

Weisenburg, T. H.: Editor, and Numerous Contributors. MANUAL OF NEURO-SURGERY. Government Printing Office, Washington, D. C.

Thirty-four collaborators, all well-known as excellent workers in the neurological and neuro-surgical fields, have compiled this very excellent manual which is an extended edition of an earlier compilation on war surgery published in 1917.

General Anatomy and Physiology of the Brain, Cranial Nerves and their Disorders, Fractures of the Skull, Cranial Trauma, Gun Shot Wounds of the Head, Cranial Operations, Spinal Cord Injuries, Peripheral Nerve Injuries, the Vegetative Nervous System, Cerebrospinal Fluid, Meninges, Neurosyphilis, Nasal Sinus and Postmortem Technic are the topics making up the main part of the book. Over 200 illustrations have been utilized to bring out the text and all in all the manual is a most creditable and useful compilation, which offers a succinct and yet authoritative compendium for quick reference for the purposes of the army medical officer.

Although the sudden cessation of the war may limit its use it can be recommended even though larger and more comprehensive texts may be available to the student of neurological problems. The war neuroses are omitted.

Freud, S. EINE KINDERHEITSERRINNERUNGEN DES LEONARDO DA VINCI. Zweite, vermehrte Auflage. Franz Deuticke, Leipzig and Wien, 1919.

It will be recalled that the first edition of this small brochure has been rendered into English by A. A. Brill and has been received with considerable interest. It was the first and most fundamental study of the unconscious well-springs of human genius from the psychoanalytic viewpoint and has been the inspiration of many lesser expositions.

A second edition has now come from the author which contains a number of notes and emendations, clarifying some of the suggestions made in the first edition and bringing new evidence bearing upon the life history and development of this most interesting of middle age personalities.

We welcome this new evidence that adds to the value and fascination of the original study.

Kielholz, A. JAKOB BOEHME. EIN PATHOGRAPHISCHER BEITRAG ZUR PSYCHOLOGIE DER MYSTIK. Franz Deuticke, Leipzig and Wien, 1919.

Since the appearance of Sadger's study on "Sleep Walking and

Moon Walking" which constituted Vol. XVI. of the "Schriften zur angewandten Seelenkunde," and of which a translation is now appearing in the *Psychoanalytic Review*, this interesting series has been interrupted by the war activities. They are now resumed in the appearance of a second edition of Freud's, Leonardo Da Vinci, and this volume on Jakob Boehme.

Jakob Boehme was a mystic of the sixteenth century. He wrote many volumes and had great influence in his day. The ideas that he expressed, the rich phantasies and extravaganzas of his "innermost experiences," were they to come to concrete expression at the present time, would appear weird, yet in attenuated and resymbolized forms they are present everywhere about us. There are thousands, even millions of people, right here in the community today, who take up, utilize, and apparently need, the type of ideas promulgated by the mystics, which in a more primitive form are discussed in this book.

It is unworthy of the intelligence of modern day medicine to stigmatize any manifestation of the human psyche as "crazy" or "cracked," simply because the functions which these "ideas" subserve are unknown or unappreciated, even when such ignorance is present even among psychopathologists, whose occupation it is assumed to be, to understand and adequately to evaluate such types of human thinking.

It is a deep regret of American psychopathology that William James left us only a fragment of his deep sympathy with human endeavor in his "Study on Varieties of Religious Experience" for had he been spared for further elucidation of the function of those particular types of thought-function termed religion he would have undoubtedly contributed much to our understanding of the great value to human culture that such forms of symbolic activity have subserved.

Pfister, in his psychoanalytic investigation of Zinzendorf, Silberer in his *Studies in Mysticism*,¹ Stanley Hall in his volumes on the Psychological Christ, are among the later students of some of the most striking and valuable of the assets of modern society in the growth of religious beliefs and quasi religious sects. Kielholz has now added another volume to this group dealing with the functions of mysticism; varying somewhat from James, or Stanley Hall, however, who accent somewhat more distinctly the historical and general dynamics of the value of the symbol in its evolution, Pfister, Silberer and the present author have utilized the psychoanalytic research method and thus entered more into the fundamental origins of these spiritualistic needs. He has thus verified the work in part of these authors and furthered the interpretative values of the method for the modern psychopathologist who may be called into practical contact when the mystical functional compensation has broken down, as it frequently does—just as other mental compensation mechanisms fail in their adaptive function in the real world of today.

Most of the surgeon's problems are obvious; the internist has a

¹ Translated by Jelliffe. Moffatt, Yard and Co.

greater veil to penetrate; the neurologist's facts are even more involved, intricate and variously integrated, while the psychiatrist, whether functioning as physician, pedagog, or sociologist, deals with the highest and most complex of all human phenomena; it is little wonder that he seems least well equipped to solve problems which crowd upon him in aggravating urgency.

American psychopathology, quite like American economics, has been heretofore too busy with the immediate pressing needs of organization. It has had to establish its clinics, its teaching staffs, its psychopathic hospitals, its literature. It has had scant leisure for problems which seemed transcendental and in the region of "pure science." It has almost entirely neglected the questions of racial psychology, or of the manifestations with which this book deals. Why are there theosophical, mystical, outlying religious forms and beliefs? Why and wherefore the values of these things for human beings? How can they be comprehended, therapeutically utilized and sympathetically valued?

It is to such that are interested in this type of inquiry that the volume here indicated will appeal.

Parker, G. H. *THE ELEMENTARY NERVOUS SYSTEM.* J. B. Lippincott Company. Philadelphia and London.

This series of Experimental Biology Monographs which started with Loeb's *Tropisms*, already reviewed in our columns, advances to this fascinating volume of Parker's. The author first calls our attention to the early descriptions of zoölogical neurology in terms of the human mechanism. He here makes an attempt to correct this tendency and endeavors to restrict his descriptions as far as possible to carefully controlled observations. The sponges, coelenterates and ctenophores supply the chief material of the work. After a general introduction, which hastily runs over some historical details, Parker begins a description of effectors systems in the sponges and then in higher types, showing the presence of independent effectors.

Sponges represent that stage in evolution in which a primitive type of muscle tissue has made its appearance unaccompanied by nervous elements. Sponges then may be said to have effectors, but no receptors or connectors. They mark the beginnings of the neuromuscular mechanisms in that they possess the original and most ancient of its constituents, muscle, around which the remainder of the system is supposed subsequently to have been evolved. This neuromuscular hypothesis Parker has advocated now for some ten years. Furthermore in the sponges a sluggish form of transmission that may be considered the forerunner of nervous activities is to be found and this may represent the germ from which has sprung the real nervous system of more complex animals.

Parker then entertainingly develops this more advanced effector, connector receptor type of nervous system in the higher forms. In his concluding chapter he collects the observations hastily outlined, bringing

to a close a volume of much interest, showing sound scholarship and offering a splendid rapid review of the beginnings of the nervous system.

Sinclair, May. MARY OLIVIER. *A LIFE*. The Macmillan Company, New York, 1919.

It is the compressions and the repressions of the past that have made this the age of analysis. Once not so long ago the world was too content to accept things in the mass, or rather it was striving vainly after contentment, which should come through some fixed ideal, some accepted creed and system. It held itself however too rigidly from its own vital inner nature in so doing. Its striving became fruitless for this reason—its old ways of striving, or the disguises under which it had hidden them began to show their barrenness for health and effectiveness. Hence has arisen the need and the demand for so much analysis. It has proved itself necessary to get at the individual facts of desire and need and the effort to satisfy these.

Like every reaction this reaches sometimes so far that it overstrains at its function. It may even weary to a certain extent those who would gladly find and make the new method of looking for facts a tool which cuts directly, serviceably, with a certain glad courage into the very elements of any one's mental life in all its variety and depth. May Sinclair's novel, "*A Life*," manifests the tendency, the need for analysis of one's own inner aspirations and difficulties and of the circumstances in which these find themselves and with which they have to battle or to which they may adapt. The circumstances too show themselves to be the results of the same aspirations and difficulties or partial successes of other individuals. Yet May Sinclair has fallen perhaps into too great a detail of analysis.

A novel after all has two purposes just as a psychoanalytic clinic has. It must faithfully and honestly set forth in detail the life of the heroine and those who make her environment until the lesson is brought home to another struggling soul that here is the understanding and the self knowledge that it needs. It must also however find a synthetic fulfilment which is the constructive gathering of the details of a life, at last understood, into a healthy working whole, whether attained in the heroine's life or only suggested even through failure, into an ideal and an incentive which we can call an artistic creation. Such Mary Olivier attains at last to a pretty healthy degree, one possible, through a better understanding, to almost any human struggler. Therefore the possibility, the artistic whole has not been left out of the reader's view. Still for a book, a work of art, rather too much time has been spent upon the long detail of Mary's learning to know. Because it is an artistic product we must ask of a novel to present the final synthesis a little sooner. It must not be protracted into the more prosaic series of therapeutic sittings.

Nevertheless the clinic hour and the necessary clinical pressure which each earnest individual must bring to bear on his or her affairs in the mental life can profit here. In the face of all the possibilities and difficulties from within and without one can learn much from the "exhaustive analysis" which Mary has spent upon herself and her family environment. The child complex is there in its variable attitude toward a father who roused ill-assorted feelings of fear and desire, disgust and a sort of terrorized wonder—see the first dawning childish half dream and the later difficulty with the father's boorish jealousy. There is the difficulty with a mother who rules in unconscious tyranny of sweet helplessness and religious conviction of the narrowest type. And so on the analysis goes discerning the factors which make life so hard for any child, drive him or her into "strange" ways of thought and action. So these seem to the blind, those to whom their own fixed conceptions are the only possible ones. And all the time the child is the host of desires, powers, abilities the most natural, the most productive of healthful biological, social, intellectual expression. These may easily be turned to fear, to priggishness, to more and more aloofness in the child's own rather odd and different self, and only late and with difficulty and through a more or less unrelated dash for freedom does the child find that deep peace and power which belong to its own work and its own expression.

All this may be followed and better understood through Mary Olivier and through this presentation of one such ordinarily human character in ordinarily human surroundings. Our thoughts should be awakened to question how it is in truth with our children—ours, those of individual parents or of society—and what are we presenting them of opportunity and help in understanding and expressing themselves or how and under what guise are we hindering them.

L. BRINK.

Obituaries

MAGNUS GUSTAF RETZIUS

The death of this distinguished anatomist removes a figure known over the world for his rare type of character and his no less rare and choice contributions to science. His character was the expression of the force and dignity of a personality which by inheritance and early environment as by its own self possession and development stood for the best and highest of all tradition. His father was also an anatomist of great repute who knew how to value the wealth and culture which were his for definite progressive service in the interests of knowledge. These were the gifts he bequeathed to his son. The son was born in Stockholm in 1842 and died there in July, 1919, at the advanced age of 77. He began the life of a student at Upsala and Stockholm, graduating from Lund in 1871. He pursued the life of a teacher at first, being appointed extraordinary professor of histology in the Carolina Institute of Stockholm in 1877, where he was made ordinary professor in 1889.

He felt however the opportunity which his wealth gave him and in that spirit of interest and devotion which marked his culture, chose to devote his entire time to research in the field of anatomy. He therefore resigned his professorship at an early date and spent the remainder of his life in anatomical and anthropological research. He was able to travel widely in the interests of his researches and visited many parts of Europe and America.

It was he who developed to a high degree the use of methylene blue staining in histological work and he made wide and intensive investigations in many directions. The results of his work were published for the most part in beautifully illustrated folios, the last of which appeared in 1914. He did very extensive work on the nervous system of *Lumbricus linnaeus* as well as many other lower forms. He published a monograph on the hearing in bony fishes in 1872, later in 1881-1884 one on the organ of hearing in vertebrates. He published a work on the macroscopic anatomy of the human brain in 1896. His monograph on Finnish skulls published in 1898 and one on old Swedish skulls in 1899 are representative of other similar works of interest from the anthropological side of anatomy.

He was a member of several societies, to which he brought the

distinction not only of his eminent service in anatomy and anthropology but of the high character and the strength and refinement of ideals which were his. Among the societies which counted him as fellow were the Royal Societies of London and Edinburgh, the Académie des Sciences of Paris and the Philosophical Society of America. In 1912 on the occasion of his seventieth birthday a special volume of the *Zeitschrift für Morphologie und Anthropologie* containing special articles upon anatomy was published and dedicated to him.

SMITH ELY JELLIFFE

HERMANN OPPENHEIM

This man of indefatigable energy and determination, who created for himself a wide career in neurology, died in Berlin in the summer of 1919. Berlin was also his birthplace in 1858 and it was there that he carried on his extensive work. He received his education first at Goettingen and Bonn and completed his studies at Berlin. His student days were not made easy for him at Berlin, his nationality as a Jew creating an opposition to him against which he matched his determination and personal ability. Refused entrance to the university he gathered about him a following of other independent souls and started a rival group of students and teachers. He built up for himself not only a following here among the student and teaching bodies, but he won through a long life of practice a wide recognition in Germany and in the bordering countries which largely looked to Germany for their professional service.

He profited in his studies by the influence of Westphal and he was made assistant to the Charité neurological clinic in 1883. He attained the rank of privat-docent in 1886 and that of professor in 1893. While he wrote ably upon various neurological subjects he was preëminently the practitioner whose influence extended far and wide. His papers on traumatic neuroses, syphilitic diseases of the central nervous system, brain tumors, encephalitis, cerebral abscess are all well known. His chief contribution is his famous textbook, the best general textbook on diseases of the nervous system. This is published in its fourth edition and is accessible to English readers through a translation made in Scotland.

Earnest, indomitable, with a keen interest in the problems of neurology and with a wide sphere of influence Oppenheim has made a very definite impress upon modern neurology and contributed significantly to its advance.

SMITH ELY JELLIFFE



HERMANN OPPENHEIM

The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry
Founded in 1874

Original Articles

ON DEEP-LOCALIZATION IN THE CEREBRAL CORTEX¹

BY E. G. VAN'T HOOG

AMSTERDAM

The presidential address "The Relative Value of the Principle of Localization," delivered by Prof. C. Winkler in Amsterdam on Jan. 8, 1912, was a revelation and a warning to me inasmuch as I had grown up among an army of organic specialists. It was as if Winkler had said "Certainly there is a specific organic function, just as there are definite organic diseases, but bear in mind that this specification has only a relative value; do not overlook the general function of the entire organism, which is situated in the whole organic system."

In this organic system the central nervous system occupies a very notable place. Since specialization is making constant progress, from *Volvox*, which typifies the most primitive of all multicellular creatures, up to mankind with its many complications, it follows that an increasingly greater proportion of circumscribed cellular groups [organs] are selected for specialized local work: one can well imagine therefore that the maintenance of functional unity, which is made more difficult of attainment by these circumstances, must necessarily give rise to special demands.

From this point of view, our systems of correlation or in other words the long process of chemical coördination [via blood and lymph] and the very rapid stimulatory contact through the central

¹ Ueber Tiefenlokalisation in der Grosshirnrinde. Psychiatrische en Neurologische Bladen. Feestbundel, Winkler, 1918. Translated by Sylvia Canfield Jelliffe, A.M., with emendations and additions of author.

nervous system are seen in a special light. Moreover the astonishing and startling fact that the uninterrupted functioning of small endocrinous glands, often weighing only a few grams, controls the life of the entire individual, becomes more or less comprehensible in the light of this knowledge.

But in the central nervous system itself and particularly in the brain cortex, this conflict between the general and the particular is once more revealed. The cortex, although more widely differentiated than any other organ is at the same time, by virtue of this very correlative function decidedly more of a functional unit than any other organ.

In this connection, I will point out one interesting point only: deep localization in the cerebral cortex in contrast to localization on the surface. The latter gave rise to the well-known division of the brain by Brodmann and others into regions and areas. The expression deep localization refers to the attempt to divide the cortex into functionally different layers in a direction perpendicular to the upper surface of the brain. I should like to express a conformity in this stratification as an indication of the relative conformity constantly noticeable in the structure of the central nervous system, and in that of man also.

In the following study I shall attempt to give a contribution to this conformation in the structure of the nervous system, starting from an observation made by Meynert.

In 1884 Theodor Meynert wrote: "No pathological change and no physiological experiment affords any prospect of elucidating the significance of the elements of the cortex which differ so greatly in spite of the proximity of their layers. Morphological examination is therefore almost the only method of obtaining some insight into this problem."

This morphological description of the microscopic cortex-picture has been strikingly well done by Meynert. He distinguished five cortical strata, of which the fifth is really double, and the six layers thus derived are in entire agreement with Brodmann's well-known division into six layers. [Fig. 1.]

Although Meynert was sceptical in 1884, we, in 1918, need not be so any longer, although there is need for great care in this sphere. Yet Meynert knew only three methods of research, namely, (1) morphological description and division, (2) physiological experiment and (3) the study of pathological change. Now that Edinger, Ariëns Kappers, Brodmann, Mott, Elliot Smith, and other pioneers in the comparative study of the central nervous system, have made

their appearance, we have at our disposal numerous comparative microscopic and morphological details, and in this respect the phylogenetic method promises a great deal.

In 1909, as the result of his comparative work, Kappers arrived at the assumption that the neo-cortex, as distinct from the superficial layer of fibers, must consist of two functionally different zones; namely of an outer supragranular, predominantly associative, receptive and sensitive region, [Lamina 2 and 3 Brodmann] and of an inner and infragranular region that is predominantly corticofugal and commissural [Lamina V and VI] [Fig. 1]. On the boundary between these two zones in the granulated cortical region, lies the granular cell layer, *Lamina granularis interna* (IV), which Ariëns Kappers considers receptive, emphasizing the presence of this stratum principally in those cortical areas where many subcortical fibers terminate, and also emphasizing the fact that the axis cylinders of the granules are too short to form corticofugal fibers. In addition this author brings out very strongly the intra-hemispherical and short associative character of these granular cells. He includes the *lamina granularis interna* with the external receptive strata: II, III, and IV are all receptive and associative, the only difference being that Lam. 4 establishes intracortical connections at a short distance, while Lam. 3 establishes the connections at a much greater distance. Kappers also points out the possibility that Lam. 4 as matrix of Lam. 3 might merge with the latter.

Recent work by Nissl, van Valkenburg and Nieuwenhuijse favor a special distribution of function from this standpoint.

Nissl in 1911 also pointed out that after separation of the hemispheres from the subcortical centers the upper layers of the cortex retain a certain ability for growth, while the two lower layers (IV and V) suffer a pronounced atrophy because the connection between their corticofugal axons with the lower subcortical centers is broken.

In addition, van Valkenburg in 1910, and 1913, indicated that the corpus callosum had its origin in the infragranular pyramids.

I see a further justification of this division in Nieuwenhuijse's article describing a case of *myerogiria* in the *Psychiatrische en Neurologische Bladen* 1913, from which it appears that the cerebral cortex "*is an organ consisting of at least two organic parts relatively independent of one another*" (Nissl), a peripheral cortical portion comprising the *four* outer cortex layers, opposed to which is the cortex portion made up of the *two* inner layers.

Bielschowsky, in the *Journal für Psychologie und Neurologie*,

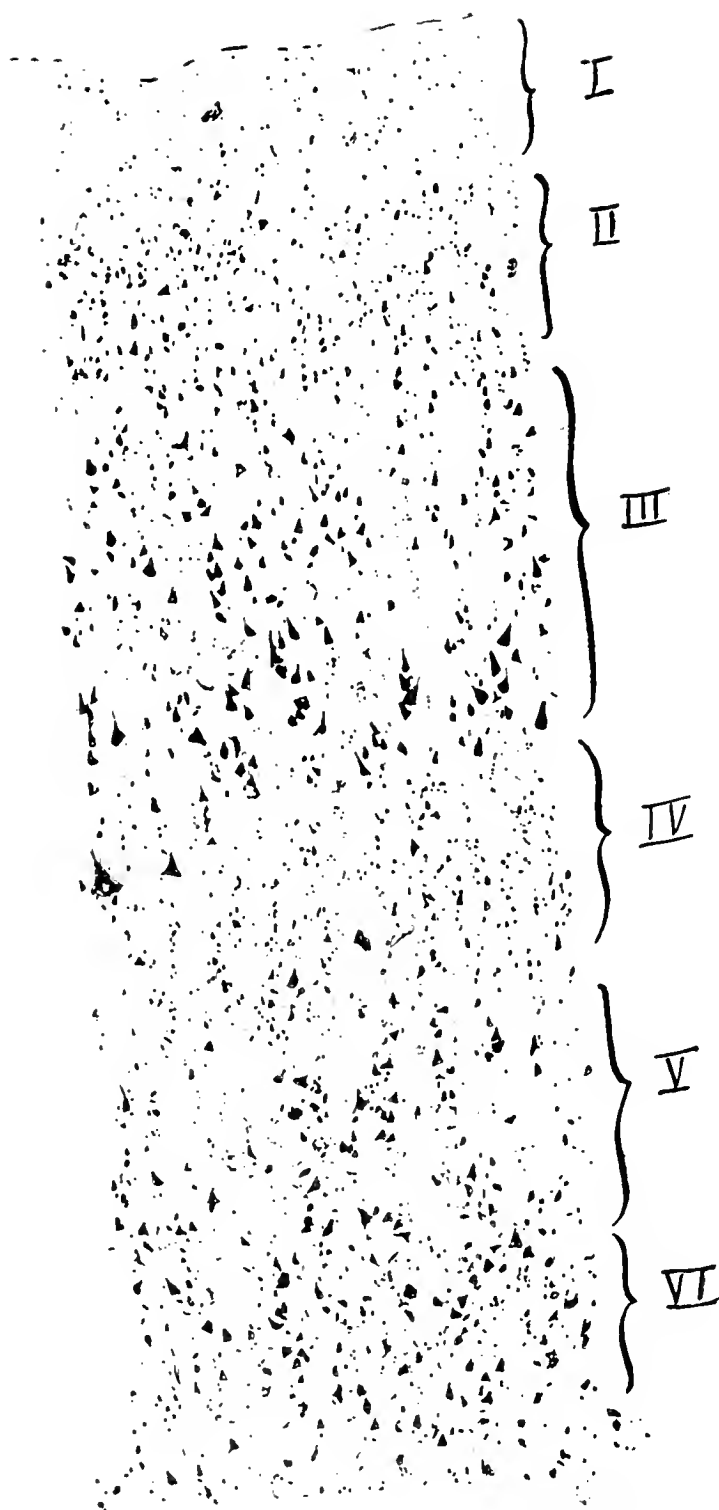


FIG. 1. Regio postcentralis in Man.
 I = lamina zonalis.
 II = lamina granularis externa.
 III = lamina pyramidalis supragranularis.
 IV = lamina granularis interna.
 V = lamina pyramidalis infragranularis.
 VI = lamina multiformis.

1917, described two cases of cerebral hemiplegia, in which he arrives at essentially the same functional stratification of the cerebral cortex as Ariëns Kappers by the method of comparative investigation, which speaks well for the correctness of this view. In Bielschowsky's very valuable and interesting study, it seems to me, however, that the author, although he discusses Kappers' work, does not see that his own conclusions are, in more than one instance, identical with the earlier publications of Ariëns Kappers. For he even refers to the fact that the subgranular layers send out the corticofugal fibers, whereas the supragranular layers possess an associative function. He has not come to a definite conclusion in regard to the granular cells. By means of these interposed neurons—he says, however,—“the sensorimotor reflexes are produced in the cortex.” Furthermore, Bielschowsky only says in regard to the behavior of granules: “The *lamina granularis interna* situated between the heavily involved *lamina pyramidalis* and the well-preserved inner layers, behaves in a fluctuating manner. In separate regions it lapses into degeneration zones, in others it has lost little of its cell and fiber content. This point is not of much import from the pathological standpoint either.”

In order to become better acquainted with the nature of the layers I have examined larger and smaller representatives of many mammalian species. Let us compare a lion and a cat. Both receptor and effector functions have increased in the lion as compared with the cat. On mathematical grounds, Dubois has emphasized that receptor functions in the larger animal increase more than effector functions. If, accordingly, the above mentioned functional division into two sections holds for the cortex, we should expect to encounter a pronounced increase in size of the supragranular cell layers.

With this question in mind I have made a comparison between the perceptible postcentral regions in larger and smaller animals, whenever possible, of closely related species.

I accordingly selected as representative of apes of the old world (*Katarrhinæ*) the small, 1-foot macaco (*Macacus cynomolgus*) with the chimpanzee (*Troglodites niger*). Of the small noses I took the silk ape (*Hapale jacchus*) and the koaita (*Ateles paniscus*). I also compared a few less well-known semi-apes. Of the beasts of prey I took cat and lion from among the *Felidæ*. Of the *Ursidæ*, the nose bear (*Nasua narica*) and the big bear (*Ursus arctos*), while of the *canidæ* I took the little griffon and the big St. Bernard.

I also examined small and large representatives of the Ungulates, rodents and marsupials (see table).

The regio postcentralis was diagnosed with the assistance of Brodmann's monographs and drawings, and the cortical fragments were extirpated for purposes of control to such an extent that the transition zones to the motor regio præcentralis could be taken out with the desired sensitive regions.

The fragments of the cortex were imbedded in paraffin and the sections from 10 to 15 μ stained with kresol violet. The cortical type was then sketched piece by piece with exactly the same enlarge-

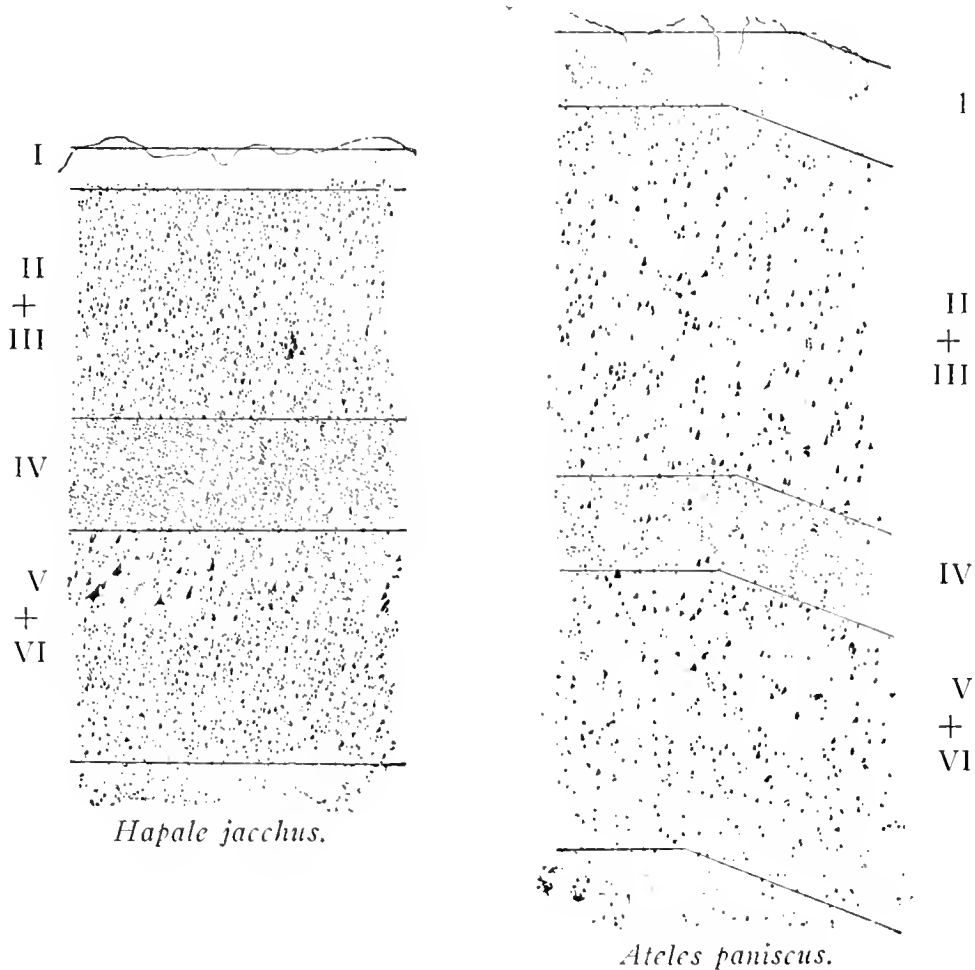


FIG. 2.

Small and large Platyrrhines.

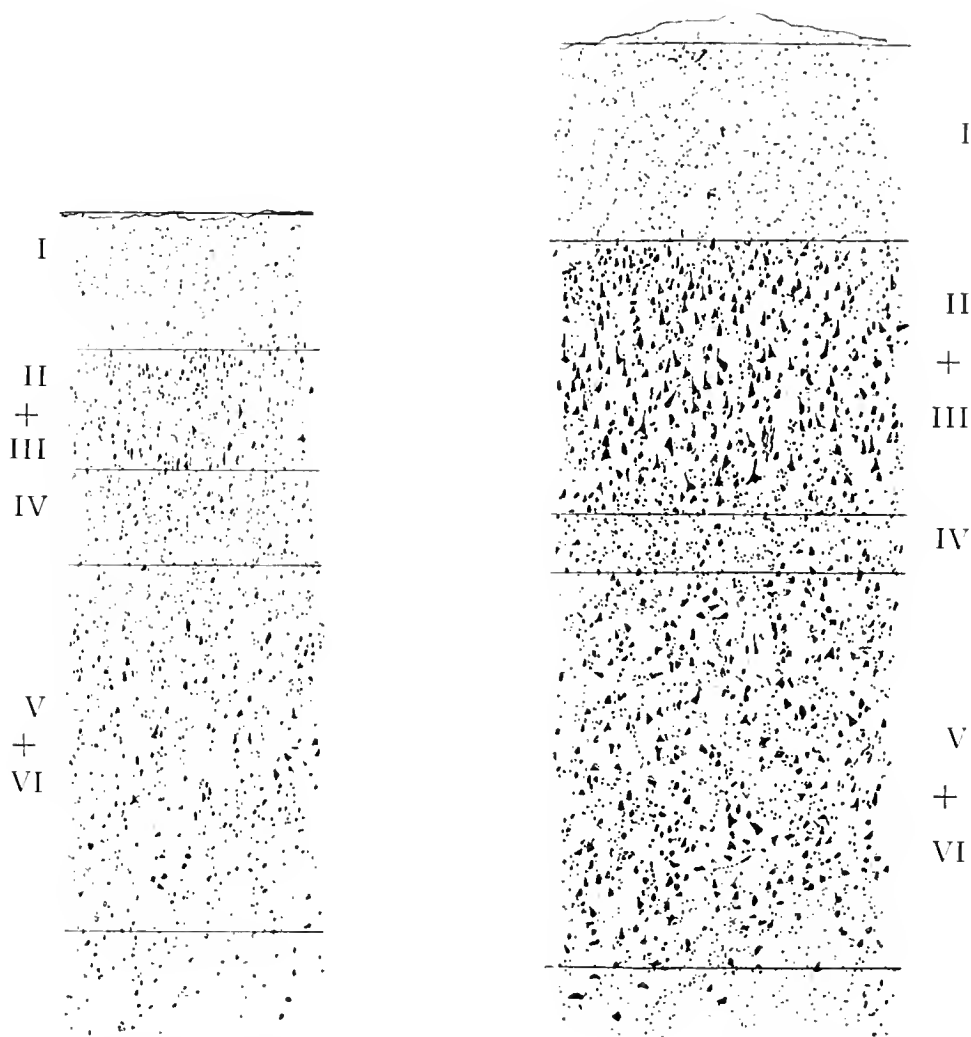
ment, by means of Edinger's projection apparatus, and while doing so I selected equivalent portions of the objects to be compared, with reference to the thicker layer covering the apex of the convolution and the thinner layer in the valley. The cortical layers were differentiated even under the projector. Later the breadth of the layers was measured to the thousandth of a millimeter on the sketch.

The following very startling results were thus obtained:

The supragranular layers of the larger animals consistently, with-

out exception, and very distinctly, appeared *higher than the corresponding zones in the related small animals*. [Figs. 2, 3, 4, 5, 6, 7 and table.]

My preparations, which tallied exactly with what was expected of them, namely that the supragranular layers would probably be of receptor type, *thus give the clearest evidence of this receptor characteristic of the supragranular cortical layers*.



Tragulus javanicus.

FIG. 3.

Rusa hippelaphus.

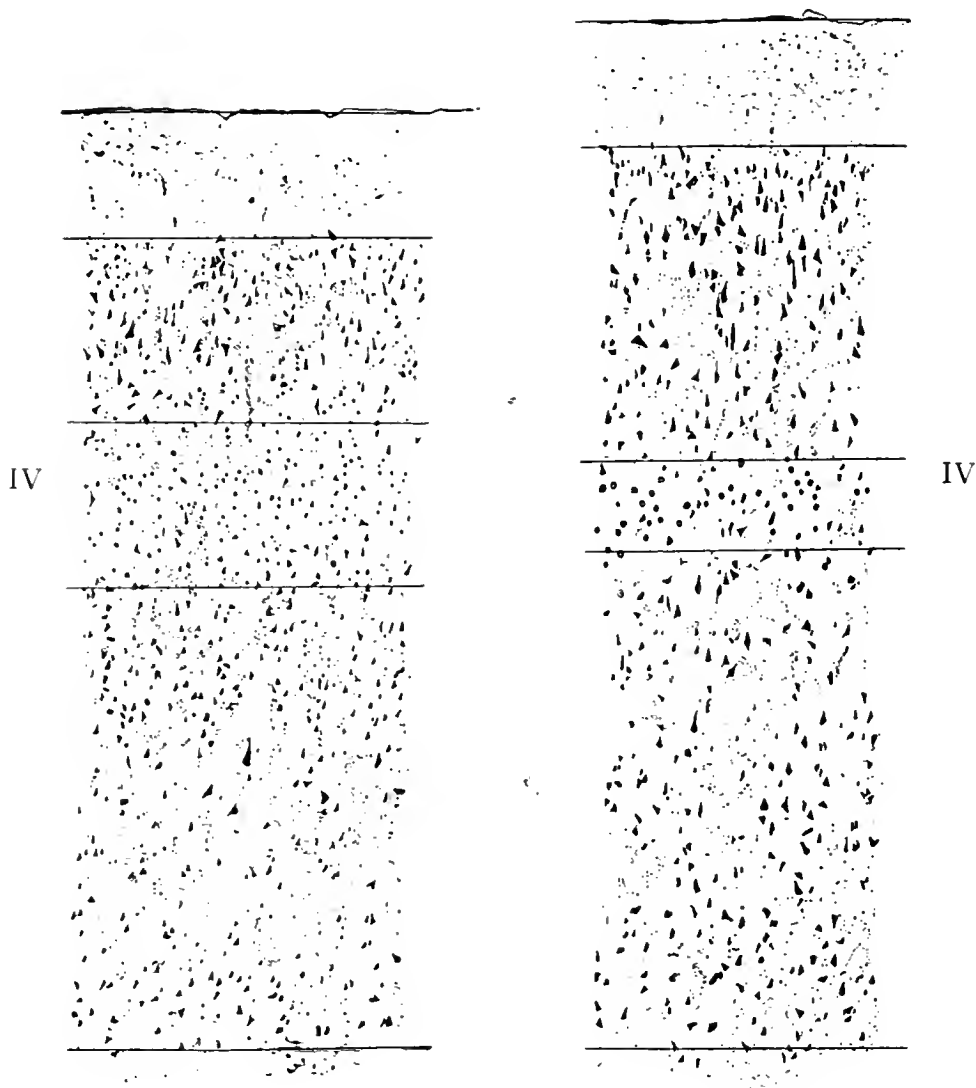
Small and large Ungulate. (Non-ruminantia.)

The granules in layer I are preponderatingly glia cells.

But there was even more. In addition to the constant increase in the supragranular layers, I found, again without exception, just as *constant a decrease of the granular layer*, a fact which, on account of the very differences appearing in the thickness of the infragranular layers, gives the total impression that the increase in height of the supragranular layers occurs *at the expense of the Lamina granularis interna*.

This places the inner granular layer in an entirely new light. In the first place it offers a surprising proof of the theory that the granular cells may become elements of the Lamina pyramidalis, by simple growth. In the second place the question at once arises: *Is there not something more behind all this?*

For the inner granular layer has many peculiarities. Brodmann, for instance, pointed out that the greatest changes occur in the cerebral region on its account. Sometimes there is a distinct layer



Ovis aries. FIG. 4. *Bos taurus.*
Small and large Ungulates. (Ruminantia.)

of these elements on the border between two different layers, sometimes these elements are lacking altogether [in the motor cortex]. In the visual cortex of mammals this layer is even found double. Why is this? Why is it lacking in the Regio motaria? Why has it been doubled in the Area striata?

At this point I should like to venture the following conjecture: *the granular cells should be considered as MATRIX CELLS.* In this sense, namely, that in the one-sided and highly differentiated pyramids, the granular cell is still present as *omnipotent neuron*, which in perhaps a further development of the nervous system,

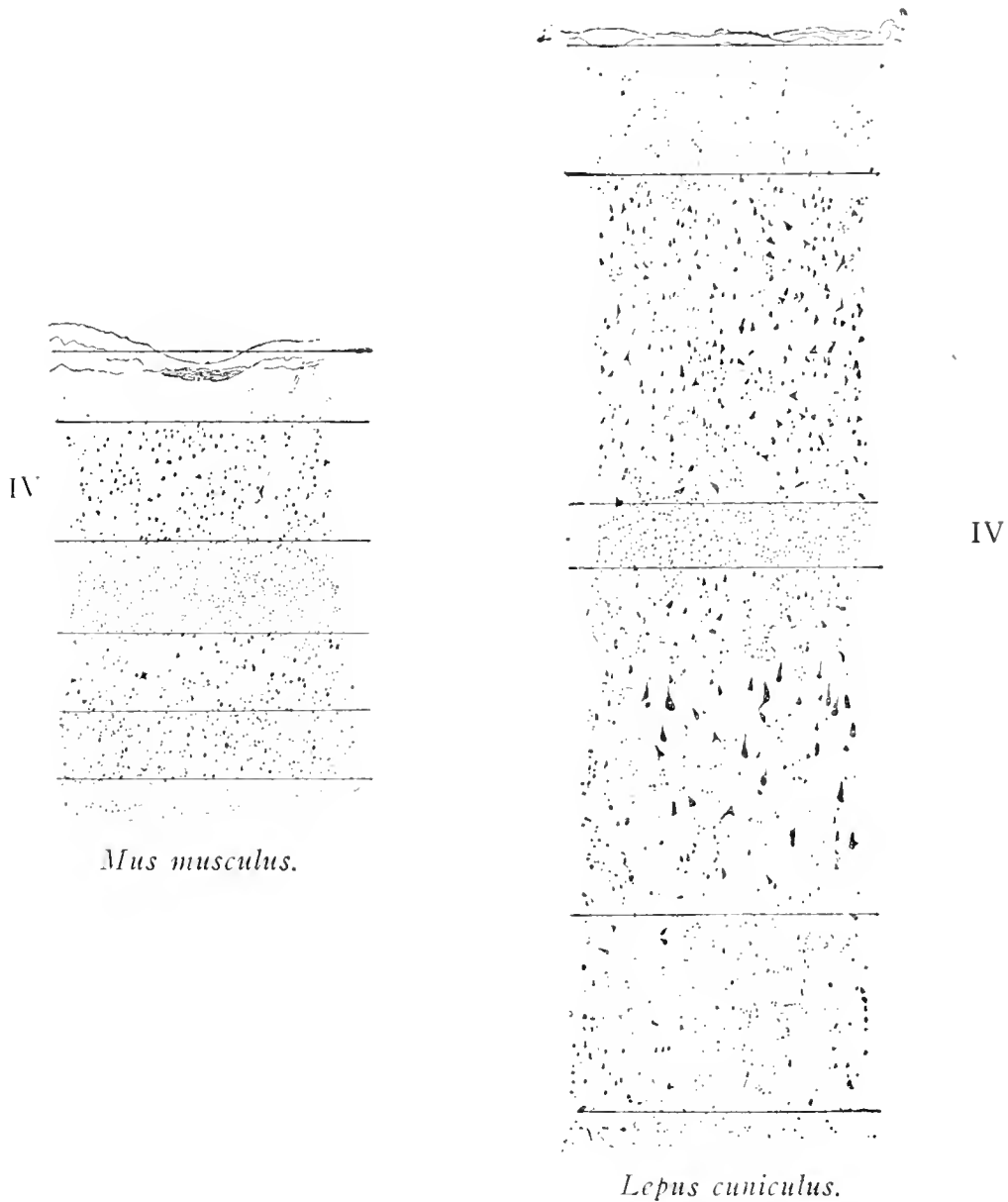


FIG. 5.

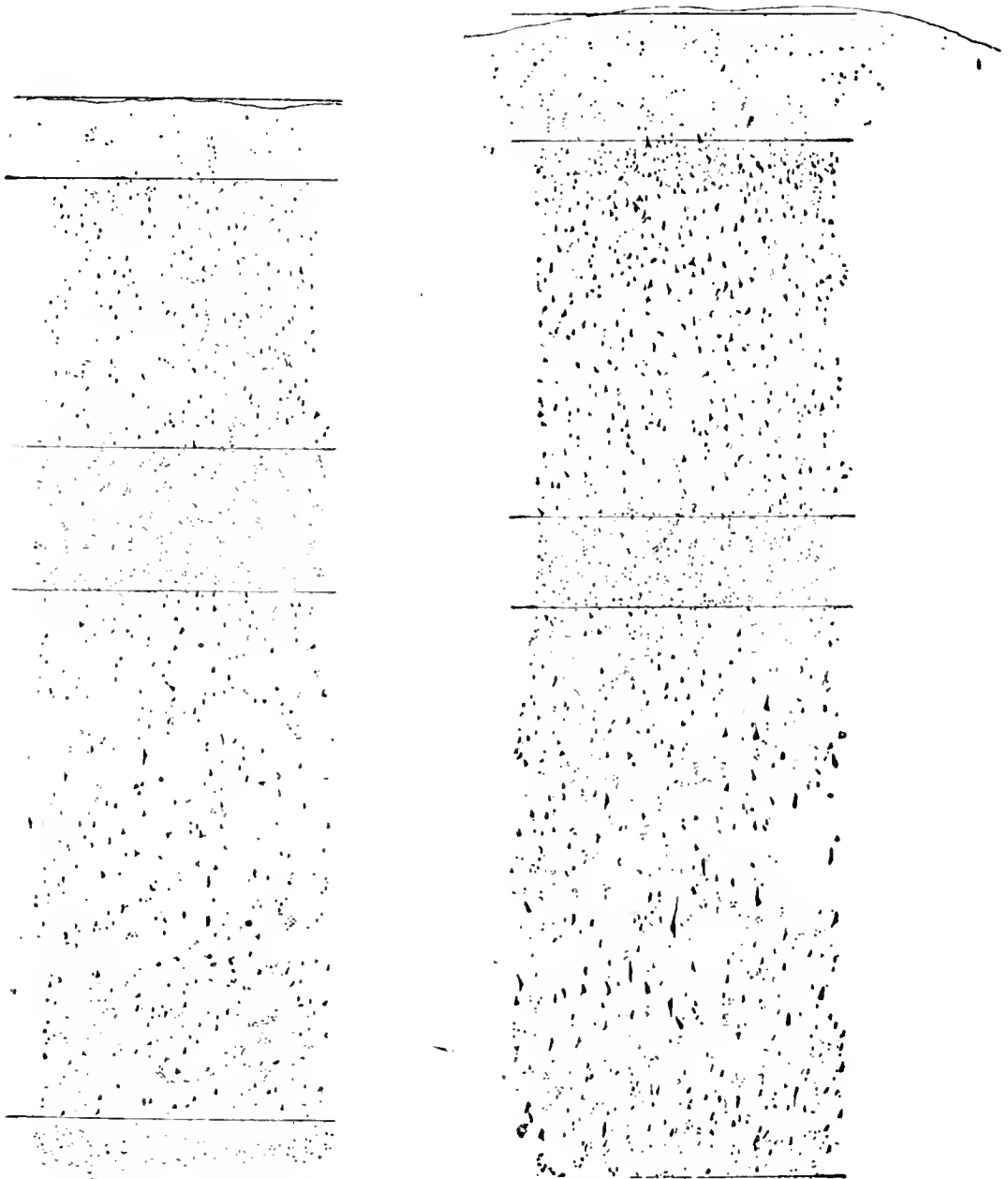
Smaller and larger rodents.

might become differentiated [in another way or to a greater extent] in a different direction. The question of the functional significance of the granular cell in a circumscribed section of the cerebral cortex then falls into a secondary place.

I cannot yet prove this matrix conception of the granular cell.

To be sure I have a number of arguments, the first of which is based on the results of the above cited comparison. (See table.)

The second argument is based on the *appearance of the archicortex* (Fig. 8 and 9).



Hypsiprymus murinus. FIG. 6. *Macropus robustus.*
Larger and smaller Marsupials.

As we know Elliot Smith differentiated between the *Archicortex* and the *Neo-cortex* of the hippocampus cortex. The olfactory fibers of the third division end in the Archicortex, whereas fibers of the third division also end in the Neocortex, fibers which are however not olfactory fibers, but which transmit sense stimuli of other

TABLE SHOWING THE THICKNESS OF THE CORTICAL LAYERS AND GRANULAR REGION [THE LATTER INDICATED BY BRACKETS].

	Total	1	2	3	4	5	6
{ <i>Macacus cynomolgus</i> ..	22.6	1.65	9.7	(26)	2.75	(69)	8.5 (27)
{ <i>Troglodites niger</i>	23.95	2.5	10.85	(38)	1.9	(47.5)	8.8 (33)
{ <i>Hapale jacchus</i>	14.7	1.0	5.45	(54)	2.7	(162.0)	5.55 (34)
{ <i>Ateles paniscus</i>	19.55	1.8	8.85	(48)	2.25	(47.3)	6.65 (36)
{ <i>Nycticebus</i>	15.35	1.4	3.6	(30)	2.05	(63)	8.3 (61)
{ <i>Lemur catta</i>	24.15	3.3	10.45	(82)	1.9	(45.6)	8.5 (52)
{ <i>Felis domestica</i>	19.55	2.8	5.75	(36)	3.05	(76.25)	7.95 (46)
{ <i>Felis leo</i>	22.05	2.75	7.75	(51)	2.1	(52.5)	9.45 (42)
{ <i>Nasua narica</i> ²	23.25	2.45	8.1	(79)	3.00	(60)	9.7 (46)
{ <i>Ursus arctos</i> ²	25.75	2.5	10.8	(88.2)	2.15	(26.5)	10.3 (47.6)
{ <i>Griffon</i>	25.5	2.8	6.15	(27)	3.75	(67)	12.8 (36)
{ <i>St. Bernard</i>	26.49	2.19	8.62	(48)	1.82	(37)	18.86 (49)
{ <i>Tragulus javanicus</i> ³ ...	17.22	3.28	2.83	(24)	2.3	(22)	8.81 (48)
{ <i>Cervulus muntjas</i> ³	19.13	2.7	4.8	(30.7)	1.86	(9)	9.77 (41)
{ <i>Rusa hippelaphus</i> ³	21.99	4.66	6.5	(45)	1.39	(9.6)	9.44 (48.5)
{ <i>Ovis arics</i> ³	22.4	3.00	4.4	(29)	3.95	(21)	11.05 (38)
{ <i>Bos taurus</i> ³	24.4	3.00	7.5	(33)	2.15	(9)	11.75 (48)
{ <i>Mus musculus</i>	10.3	1.7	2.85	(27)	2.25	(103)	3.5 (32)
{ <i>Dasyprocta aguti</i>	20.2	0.9	6.25	(72)	1.75	(48)	11.3 (83)
{ <i>Cavia cobaya</i>	16.35	2.3	2.1	(27)	2.2	(59)	9.75 (58)
{ <i>Lepus cuniculus</i>	25.85	3.15	8.0	(36)	1.55	(55)	13.15 (33)
{ <i>Hypsiprymus murinus</i> .	26.05	2.05	6.85	(30)	3.65	(113)	13.45 (49)
{ <i>Macropus robustus</i>	29.8	3.3	9.6	(51)	2.3	(57)	14.55 (51)
<i>Elephas indicus</i> ²	19.15	2.45	6.35	(19.6)	0.00	(0)	10.35 (18.4)
<i>Homo sapiens</i>	21.6	2.75	9.25	(78)	2.65	(82)	6.95 (35)

sorts. In addition to this Ariëns Kappers designates the Cortex lobi olfactorii as a still older *Paleocortex*, because only olfactory fibers of the second order terminate in it.

Phylogenetically the Paleocortex is accordingly the older brain formation.

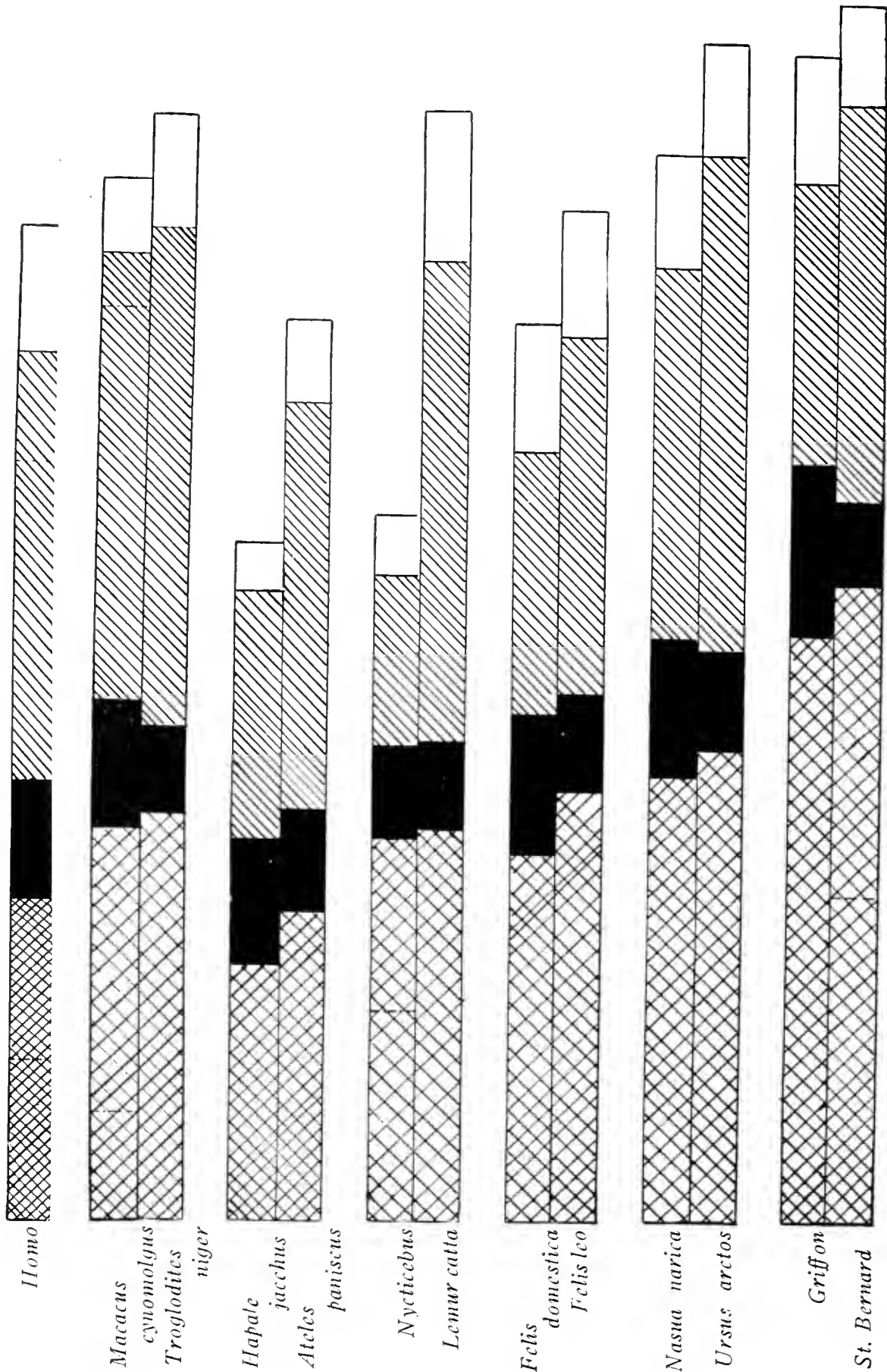
Amphibia and reptiles moreover have an archicortex, whereas the neocortex is the characteristic sign of the Mammalia.

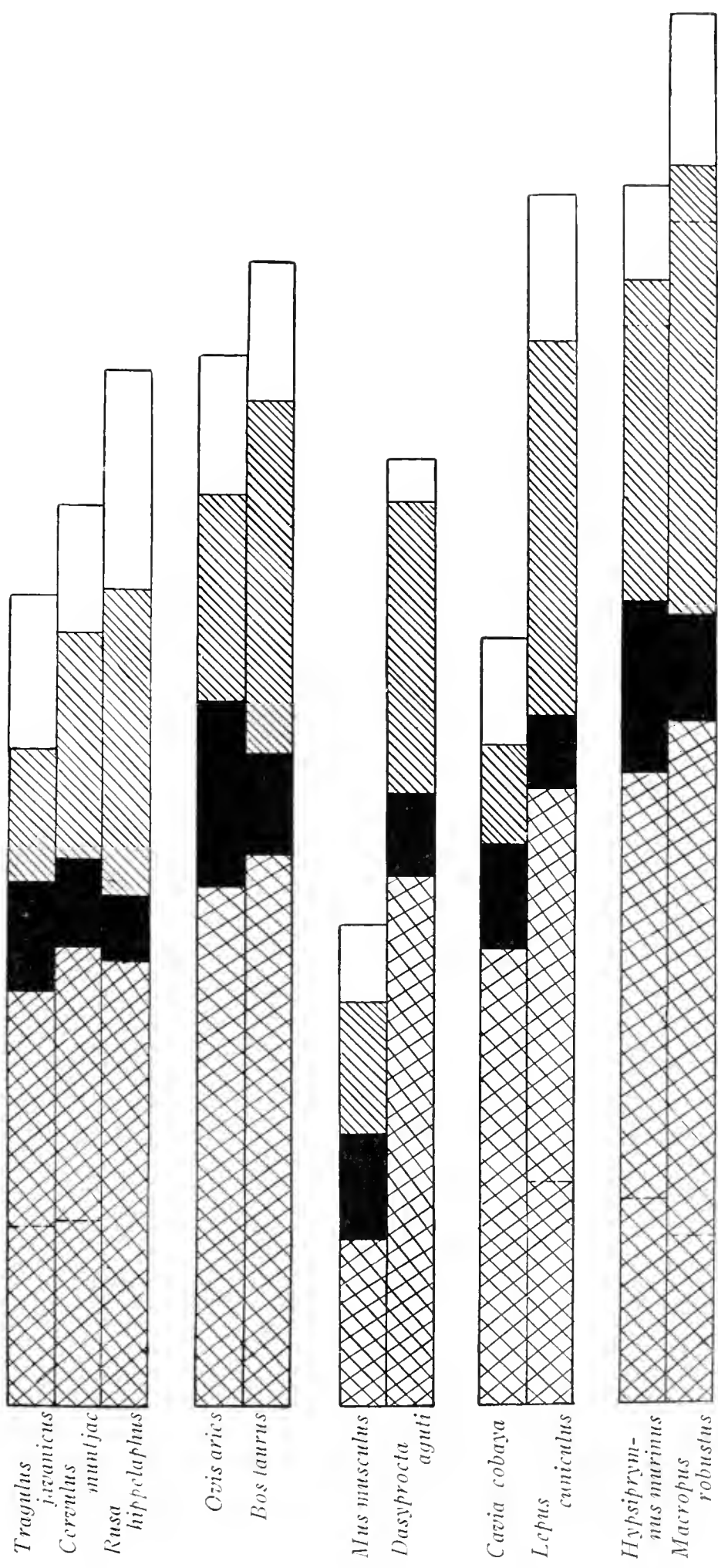
Only the neocortex shows the well-known division into six layers (Figs. 9 and 1). Paleocortex and archicortex consist of granules and pyramids: the granules of the archicortex form the Fascia den-

² Pyramids *with* glia. Moreover in the supra- and infra-granular layers the glia granules were not included.

³ Granules *without* glia. Moreover in the granular layer the glia granules were included.

I
II
III
IV
V
VI





THE THICKNESS OF THE CORTICAL LAYERS IN SMALL AND LARGE ANIMALS OF THE SAME ORDER [FIG. 7].

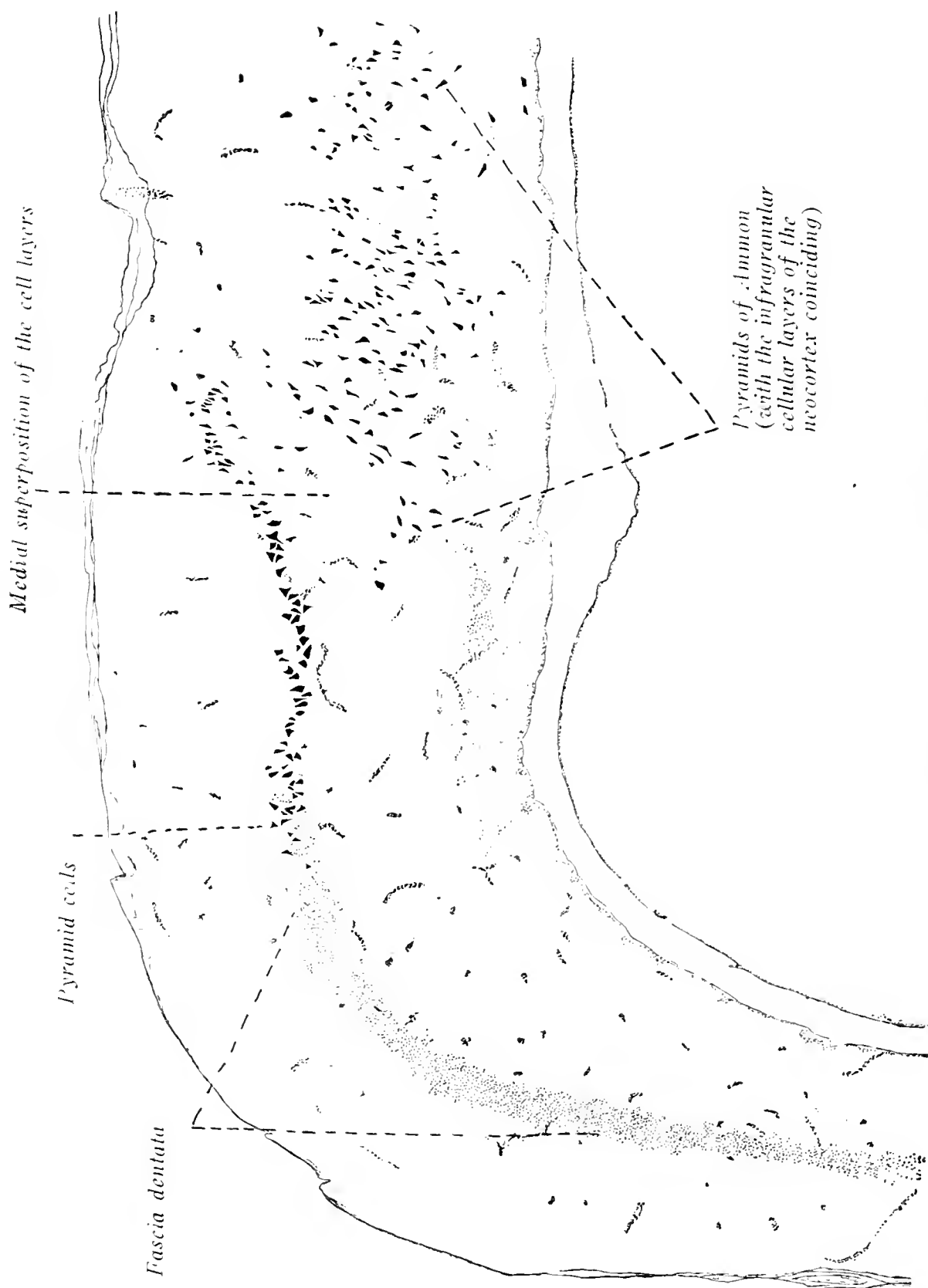


FIG. 8. Archicortex of a lizard, *Varanus salvator*.

tata, its pyramids the pyramids of Ammon. Kappers has already emphasized the fact that the key to deep localization is to be found in this. But we find here pyramids of two sorts made up of the granules of the fascia dentata: a small upper group rising like a small tail and corresponding in position to the associative fibræ hippocampi externæ; a larger group beneath, from which Forni and

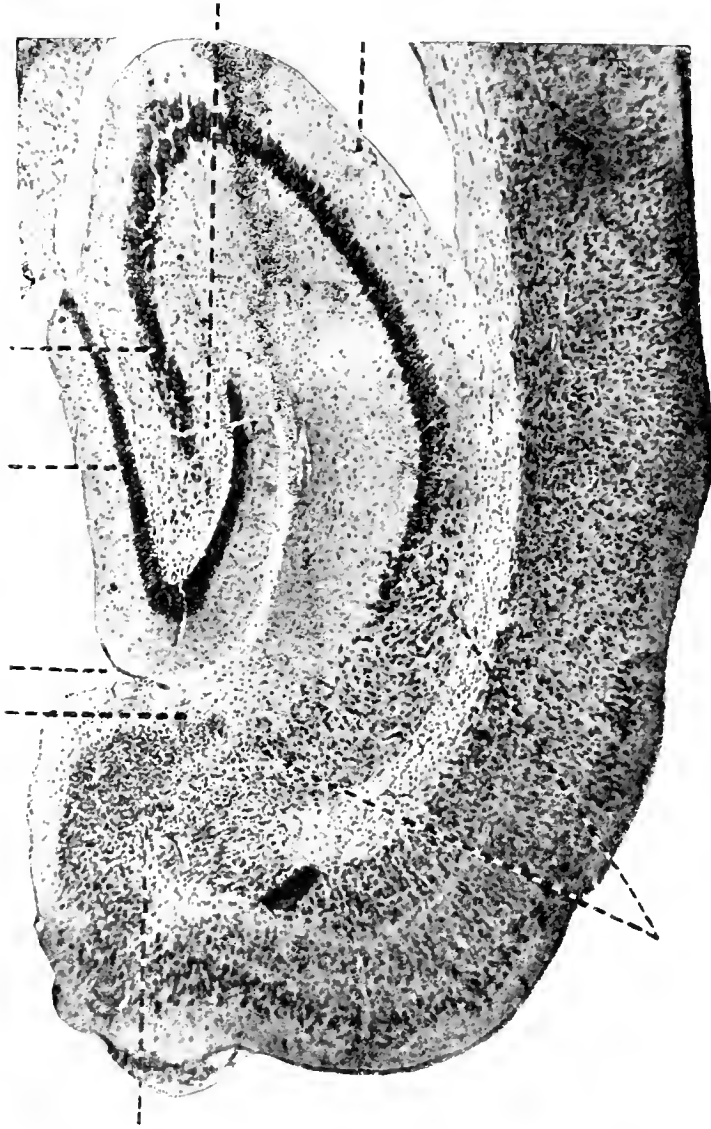


FIG. 9. Archicortex of *Mus musculus*.

Psalterium go out. It gives the impression of a neocortex drawn apart in layers in the archicortex. The Fascia dentata would then be identical with the inner granular layer, while the smaller upper group of pyramid cells would correspond to the supragranular pyramids, the lower pyramids of Ammon to the infragranular cell layers.

I should like to base the third argument on the great elephant. If the granular cell forms the only omnipotent neuron in the cortex,

it is clear that if a certain class of animal shall give rise by selection or mutation or in any other fashion to the creation of a super order, the presence of granules is a *conditio sine qua non*. Now there are classes of animals that have reached a sort of blind alley in their development, for example by reason of their size. I had the unusual opportunity of being able to examine a number of cortex extirpations in elephants. To my great joy and surprise *I no longer found a granular layer in the cortex examined*, so that I shall not hope that there were Nietshes among the elephants. For then on the basis of my investigation I should have to deprive them of their belief in a super-elephant. His reserve cells seem to be entirely expotentialized. It may perhaps be correct to name *Phocæna* and *Tursio tursiops* as equivalent examples. To be sure these are not without granules, but the granules are very sparse. The corresponding regions of the cortex in the human being are still very well supplied with granules compared to these.

The fourth fact in support of the matrix conception of granular cells is akin to the latter example. With the exception, however, that it is not based on the mammalia, but on the lower vertebrates.

As we know the amphibia are our biogenetic ancestors. The nervous system of the amphibia is very rich in granules, and these matrix cells are numerous everywhere in it. See, for example, the illustrations of *Rana mugiens* (see *f.c.*, Fig. 4 and 10) introduced in this Commemorative volume.

With these facts in view I should also like to call attention to Bolk's presidential address: "Hersenen en Cultuur." The mode of development of the human being, says Bolk, is "conservative," *i.e.*, he finds fetal characteristics in grown people. The mode of development of the apes, who have made less progress, biogenetically, Bolk calls "propulsive," in view of their essentially different development, which does not present a uniform maturing of the fetal state, but soon deviates in an eccentric direction. This consideration is quite in accord with the part played by the granular cells in the brain, if we take into consideration the very considerable granular space in the embryonic cortex. Following Bolk's train of thought one could also conceive of using the existence of a pronounced layer of granules to determine a fetal state, which criterion has the potentiality of greater differentiation in a super-type. Bolk's conclusion seems to me so interesting in this respect, that I cannot pass it by in silence.

If I were to summarize briefly the results of this investigation we would get:

1. *The supragranular cortex layers are receptor-associative in accordance with Ariëns Kappers' functional division.*
2. *The functional nature of the granules is, also, receptive and associative in the post central region.*
3. *The granular cells should, moreover, be conceived of as matrix cells, not only in the Fascia dentata, but also in the neo-cortex.*

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MULTIPLE BRAIN ABSCESES SECONDARY TO BRONCHIECTASIS AND KYPHOSCOLIOSIS¹

BY CLARENCE C. SÆLHOF

The etiology of brain abscess is, in approximately 60 per cent. of the recorded cases, due to a suppurative condition of the middle ear. Carious processes of the bones of the skull, chiefly the ethmoid, sphenoid, mastoid, frontal, etc., give rise to about 15 per cent. Brain abscess secondary to orbital injury, nasal and pharyngeal infections, traumatism, foreign bodies, etc., are the causative agents in approximately 15 per cent.

The type of abscess with which this article deals is secondary to bronchiectasis. It may result from other respiratory diseases. Coyle,² Williamson,³ Porot,⁴ Rivet,⁵ Grunberger,⁶ Schorstein,⁷ Bramwell,⁸ and others have reported cerebral abscesses of hematogenous origin from a suppurating bronchitis or bronchiectasis. Fruhwald,⁹ Ghon,¹⁰ and Dick¹¹ report brain abscesses caused by *B. fusiformis*; the two former authors record cases in which this organism caused meningitis, with subsequent involvement of the brain. Dick is the only one reporting a case of cerebral abscess caused directly by the *B. fusiformis* without subsequent involvement of the meninges. It is stated by Stengel that brain abscess secondary to lung infections are transmitted either by the blood stream or through the retro-pharyngeal lymphatics. The case which I herewith present is undoubtedly hematogenous in character, having been transmitted from the bronchiectatic part of the lung to the terminal blood vessels of the brain.

W. C., aged 30, male, colored, U. S. A., admitted with a diagnosis of

¹ From the Department of Pathology and Bacteriology, University of Illinois, College of Medicine, Chicago.

² Trans. Path. Soc., London, 1883-4, XXXV, p. 12.

³ Ibid., 1893-4, XIX, p. 379.

⁴ Bull. et mem. Soc. anat. de Par., 1905, LXXX, p. 897.

⁵ Bull. Soc. med. d. hop. d. Lyon, 1904, III, p. 299.

⁶ Prog. med. Wchnshr., 1907, XXXIII, p. 171.

⁷ Lancet, London, 1909, II, p. 843.

⁸ Rev. Neurol. and Psychiat., Edinb., 1910, VIII, p. 77.

⁹ Monatschr. f. Ohren., Berl. & Wien., 1913, XLVIII, p. 1021.

¹⁰ Cent. f. Bact., Vol. 81, p. 243.

¹¹ Trans. Chi. Path. Soc., 1914, IX, p. 95.

Pott's disease and tuberculous meningitis. Patient complains of rigidity of neck and severe pain in the head.

Present Illness: Patient took sick five days previously with headache, followed by chill and was bedridden afterwards. After the second day his neck became stiff and this stiffness gradually increased. There was spasticity of the right leg with loss of control of the same. No vomiting. Had an initial chill; sweating was constant. Patient lost eight pounds in the last two months. There have been no convulsions. On admission to the hospital, the respiration was shallow and thoracic; the pulse regular and of fair volume.

No history of tuberculosis or cancer in his family. He had smallpox ten years ago, gonorrhea two months ago, and a hard chancre a few years ago.

Accidents: Patient attributes his present trouble to an accident occurring fourteen years previous to admittance, having been caught in an elevator at that time and claims that his back was broken. He remained, however, in the hospital for only thirty days.

Physical examination: On admittance, increased reflexes, rigidity of the neck, and moderate spasticity of the right lower and right upper limbs associated with a stuporous position were evident. Patient could move head only from side to side, being unable to move it forward to the slightest degree. Eyes were negative. Kyphosis extended from the tenth dorsal vertebra to the second lumbar vertebra, with a swelling to the right of the spine in this region about the size of an orange. On examination of the extremities, the right arm gave slight spasticity, the right leg gave moderate spasticity.

Reflexes	Right	Left
Patellar	+++++	+++++
Babinski	0	0
Ankle clonus	+	+
Gordon	0	0
Chadwick	0	0
Oppenheim	+	+
Kernig	+	+
Brudzinski	+	0
Brudzinskibilateral	+	+
Cremasteric	+	+
Abdominal	+	+
Triceps	+	+
Supinator	+	+

Laboratory examinations: Wassermann reaction of the blood serum was negative three times, as was likewise the spinal fluid. Spinal fluid contained albumin (++) by the Ross-Jones method, with no sugar and 104 lymphocytes per c. mm. Urine was negative. Blood examination gave a Hb. estimation of 80, a red cell count of 4,100,000 and a white count of 8,200 cells.

A tentative diagnosis of poliomyelitis was made. A week later, the patient gradually improved. Two days later, the patient became stead-

ily worse, with spasticity of both arms, temperature ranging from 98 degrees to 103.8 degrees, and died in a comatose condition nineteen days after admission. Patient had had no convulsions since entering the hospital.

A *necropsy* was performed and the anatomical diagnosis was as follows:

1. Bilateral brain abscesses.
2. Pus in the right lateral ventricle.
3. Bronchiectasis of the right lung.
4. Fibrosis of the right lower lobe of the right lung.
5. Bilateral adhesive pleuritis.
6. Left broncho-pneumonia.
7. Kyphoscoliosis.
8. Fetal lobations of both kidneys.
9. Chronic localized fibrous peritonitis.
10. Alopecia.
11. Sacral decubital ulcers.
12. Hemorrhoids.

Little need be said about the appearances of the different organs grossly, as they appeared practically normal.

The cardiac musculature microscopically shows a segmentation and fragmentation which have been described as being associated with acute infections or sudden deaths. Voluntary muscle appears normal.

In the kidney there is faint outline of the former cells and the cytoplasm has become granular. Some of the cells are loose in the lumen of the tubules. The glomeruli are swollen, completely filling the capsule of Bowman. The capillaries are extremely distended.

The spleen shows hyperplasia of connective tissue in the capsule, trabeculae and arterial walls; otherwise it is normal in appearance.

Liver shows no change except slight fatty infiltration.

Kyphoscoliosis was present from the tenth dorsal vertebra to the second lumbar vertebra, and appeared as an extremely marked deviation to the left. This curvature of the spinal column formed a large, hollow cavity on the right side, of a size much larger than a person's two closed fists. Into this was wedged the right pleura and lung, firmly bound down by extremely dense, fibrous adhesions to the spinal column and chest wall. There was marked fibrosis of the lower lobe of the right lung. The pleura of the lungs were covered by fibrous tags, which firmly bound them to the parietal pleura. Crepitus was present throughout all portions of the upper lobes of both lungs. On section, the lungs presented a moist edematous appearance, with prominent outstanding bronchioles. In the left lung were small patches of broncho-pneumonia. The right lower lobe showed wide, outstanding dilated bronchi surrounded with masses of dense fibrous adhesions.

Microscopical sections of the left lung showed dilated bronchioles filled with a homogeneous staining substance and surrounded by a red

staining consolidation largely made up of white cells and erythrocytes. The air cells are densely packed with cellular exudate near the bronchioles, while near the periphery of the area, the alveolar exudation becomes less. Other alveoli are distended and quite empty. The consolidations radiate into the adjacent tissue and presents a typical picture of broncho-pneumonia.

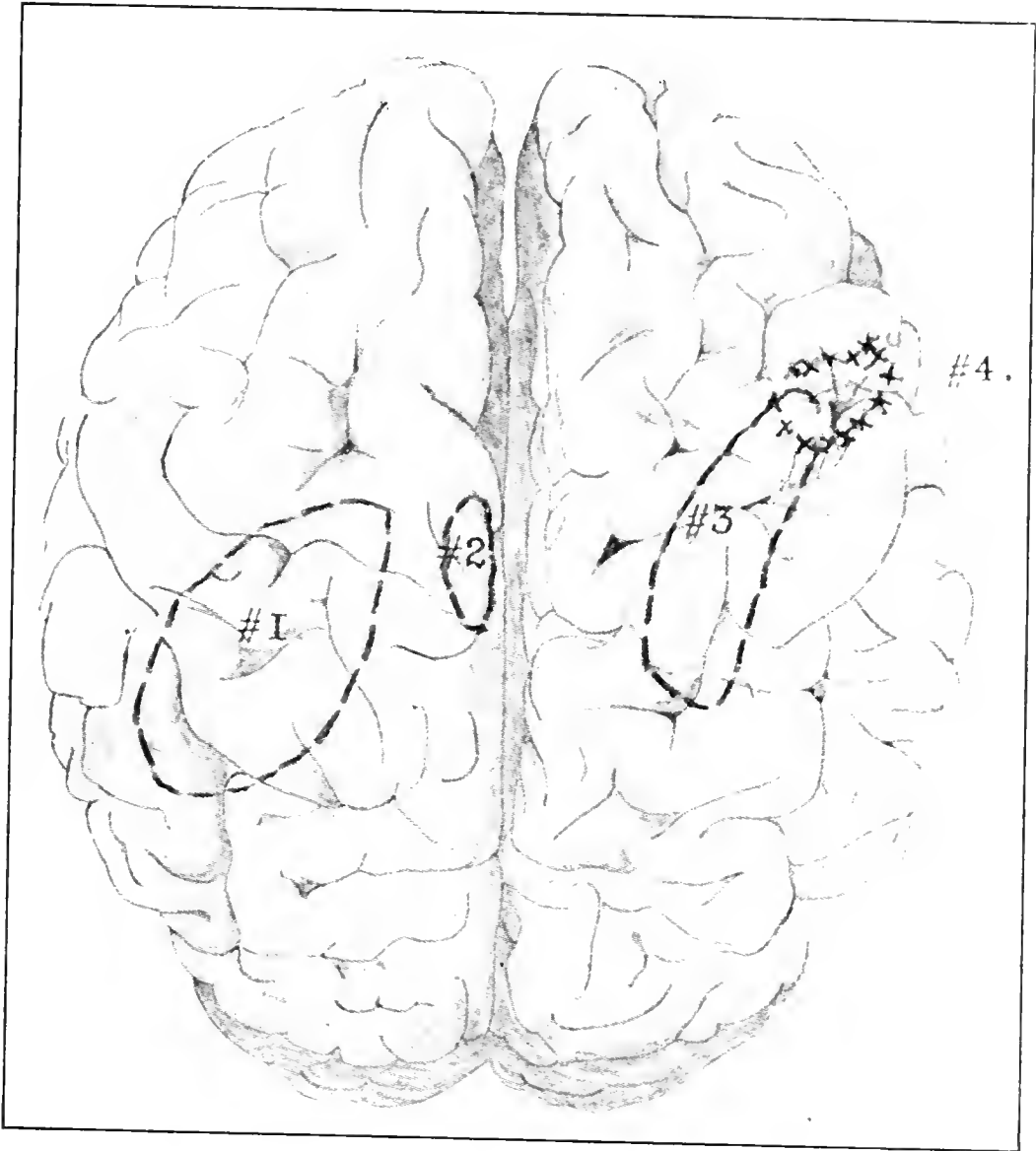


FIG. 1.

On opening the cranial cavity, there was noted a slight increase in the amount of cerebrospinal fluid and slight hyperemia of the meninges. On section of the brain, four abscesses were found, two in each hemisphere. The outline and extent of the cavities are illustrated in Fig. 1.

Cavity No. 1 measured 45 mm. in length and at its posterior end was 7 mm. from the mesial surface of the brain. The diameter of the abscess in its posterior portion was 20 mm. with a capsule of connective tissue

completely lining it, 1 mm. in thickness. It continued forward and downward so that the anterior end of the abscess was 30 mm. from the dorsal surface of the brain whereas the posterior end was 20 mm. from the dorsum of the brain. In this abscess, only the white matter of the brain was involved.

Cavity No. 2 was much smaller, measuring 6 mm. in length, with a dorso-ventral diameter of 9 mm. and the medio-lateral diameter of 5 mm. giving, on cross-section, a sort of diamond shaped cavity. A distinct capsule 1 mm. thick can be seen lining the cavity throughout its entire periphery. This abscess involves both the white and gray matter, lying at the anterior aspect of the gyrus temporalis medius, between the gyrus temporalis superior and the gyrus temporalis inferior.

Cavity No. 3 measured 57 mm. in length, and had collapsed following accidental evacuation of pus during removal. It measured 41 mm. in the dorso-ventral diameter, a width of 1 mm. (due to its collapsed conditions) and surrounded throughout its entire course with a capsule of 1.5 mm. in thickness. The posterior tip of this cavity involves the white matter of the brain only; as it progresses forward, it extends ventrally till it has a small outlet to the exterior surface of the brain on the mesial side just above the corpus callosum. This opening, which was at its anterior end, in the region of the gyrus centralis anterior, was caused mechanically in removal of the brain; there was no evidence of meningitis. (Undoubtedly this part of the cavity involves the motor area controlling the neck, arm and leg, hence the spasticity in these parts.)

Cavity No. 4 is situated at the anterior end of cavity No. 3 and slightly mesial to it and is small in comparison with the other abscess. It is 9 mm. in length and 8 mm. in width. A capsule .5 mm. thick encloses the whole abscess. It is located 15 mm. from the dorsal surface and 10 mm. from the medial surface of the brain, and involves only the white substance.

Microscopical sections of the walls of these abscesses stained with hematoxylin and eosin varied according to the localization of pus foci, areas of necrosis, hemorrhages, etc.

The polymorphonuclear cells were the most prominent type of cell seen throughout the inflammatory area. They were in all stages of degeneration; some had as high as five nuclei, while the predominating number in all sections were two or three nuclei. Many disintegrated cells were evident, only the nuclei being visible and showing fragments of nuclear material.

Plasma cells, variable in size and with the large type predominating, were found in small numbers. Nuclei were generally single, although some cells with double nuclei and a few with triple nuclei could be distinguished. Disintegration was evident in some of the nuclei by the protrusion of granules; in places, free nuclei were found. The plasma cells seemed to be located near the periphery of the inflammatory area and only a few were found near the pus zone. Large, round, vacuolated

cells, with a round or oval nucleus, placed at one end of the cell, were discernible both within and without the pus zone, in greater numbers, however, outside the pus area. These appear to be large mononuclear

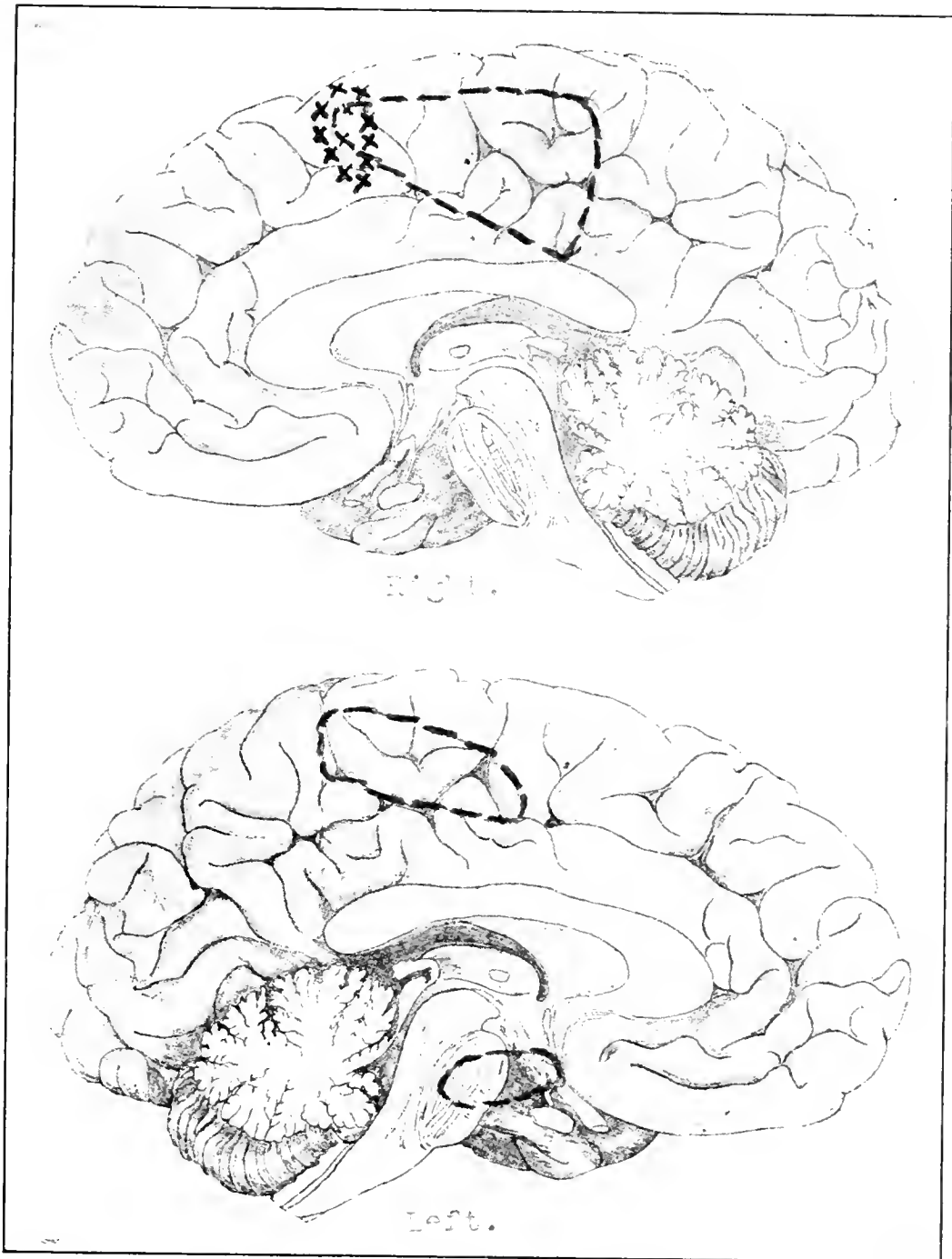


FIG. 2.

wandering cells. Fibroblasts could be seen in all parts of the inflammatory area.

An extremely thick exudate, composed chiefly of fibrin, was seen in sections of all the abscesses. It was laid down in such compact masses

that it was hardly possible to recognize it as fibrin. It appeared in long, wide strands, at right angles to the wall of the abscess, devoid of any cellular structure, and simulating the appearance of a homogeneous, collagenous material. In certain small areas, the characteristics of fibrin could not be made out, and it was only by careful study that this collagenous appearing material was determined to be that of fibrin. In some sections, particularly those of abscess No. 3 and No. 4, small round or oval masses were seen deposited in the brain tissue just at the edge

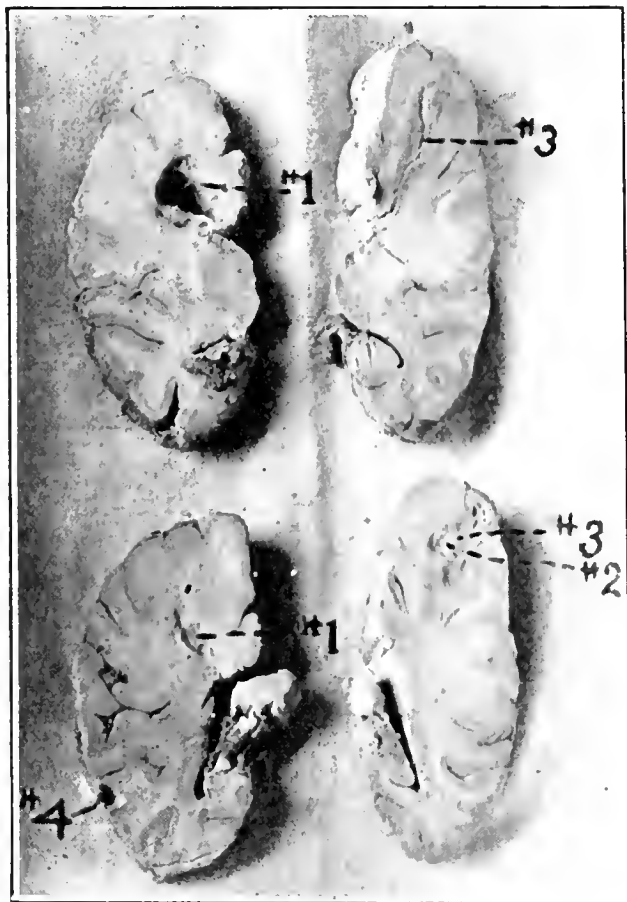


FIG. 3.

of the inflammatory area, completely surrounded by a small capsule of connective tissue.

Necrosis is evident in two regions. Here are completely disintegrated cells, and many pycnotic nuclei. Perivascular infiltration was noticeable throughout with many of the vessels hyperemic. In some portions, extensive foci of hemorrhage were evident.

Few ganglion cells appear in the inflammatory zone. Outside this area, these cells have lost most of their cytoplasm, only the nucleus remaining. These nuclei take the stain very poorly, due to the lack of chromatin material.

Most of the abscesses involved only the white substance of the brain,

comprising the association fibers, commissural fibers and the projection fibers. Only two abscesses involved the gray matter to any degree: abscess No. 3, which had eroded away a portion of the gray matter at its anterior end in the region of the gyrus centralis anterior. This eroded portion is located in the motor area controlling the movements of the neck, arms and lower limbs, and undoubtedly was the cause of the spasticity of these portions of the body. Abscess No. 2 involved a portion of the gray matter in the gyrus temporalis medius and probably involved a portion of the auditory center, although no record of defective hearing is recorded in the clinical history. The rest of the involved tracts were the association, commissural and projection fibers. The striking thing is that more definite symptoms of derangement of the paths of the brain due to the large size of the abscesses and their locations did not occur.

On section of the brain, a large quantity of green, foul-smelling pus exuded and, on smear preparations, stained with a Gram stain showed Gram positive cocci in diplo- and short-chain forms, and a Gram negative, curved, beaded, often long, segmented bacilli with sharp pointed ends (*B. fusiformis*). A growth on blood agar under anaërobic conditions gave Gram staining cocci and long Gram negative bacilli. Under aerobic conditions, neither cocci nor bacilli were found; only a few large, white colonies, which were, without doubt, contaminations.

From the bronchiectatic cavities a bloody, mucoid exudate was obtained. Smears stained in the same manner gave Gram positive cocci in short-chain formation, and Gram negative bacilli, curved and sharp pointed. Cultures under anaërobic conditions gave a Gram positive cocci, with long Gram negative bacilli (*B. fusiformis*). Under aërobic conditions, the tubes were overgrown with putrefactive aërobic organisms.

Kyphoscoliosis was present from the tenth dorsal vertebra to the second lumbar vertebra, and formed an extensively marked deviation to the left. The etiology of the kyphoscoliosis was apparently due to the "broken back" which the patient had had fourteen years⁹ previous. This curvature of the spinal column caused the large, hollow cavity on the right side described above and into this aperture was wedged the right pleura and lung. It was in this recess or pocket that the bronchiectasis developed and here the anaërobic, *B. fusiformis* and anaërobic streptococci, grew, there being little chance for drainage. Presumably thence by the hematogenous route, the organisms localized in the brain, causing the multiple abscesses. I have been unable to find any record or report in the literature of a brain abscess occurring secondary to kyphoscoliosis.

The organisms isolated from the pus of the brain and the bronchiectatic cavity were, without doubt, the same; long, spindle-shaped bacilli with their greatest diameter in the middle and tapering out to narrow ends, taking the Gram stain both positive or negative, depending on the

degree of washing with alcohol. Dick¹¹ found the actinomycosis-like bodies in the pus of the abscess, and from the pus isolated pure cultures of *B. fusiformis* similar to those found in tonsils. Such bodies were not seen in our case.

As to pathogenesis one can readily see how with the lung packed away in a pocket formed by the kyphoscoliosis of the spinal column, with poor drainage, a bronchiectasis would furnish conditions for the growth of the fusiform bacillus; thence through the blood stream, the infection localized in the brain, causing multiple abscesses. Most authors agree that commonly various organisms are transmitted through the blood stream or through the lymphatics to the brain. As the most frequent invaders may be mentioned the pneumococcus, tubercle bacillus, staphylococci and the streptococci; fusiform bacilli are rarer invaders. Fusiform bacilli are found occurring in the mouth, beneath the gums, around carious teeth, in tonsils both normal and diseased, in Vincent's angina, noma, etc. Davis¹² demonstrated the occurrence of *B. fusiformis* living in symbiosis with streptococci and spirilla in the actinomyces-like granules found in normal and diseased tonsils.

It would seem reasonable that the fusiform bacilli and cocci, found in these various localities, pass down the trachea and bronchi into the bronchiectatic cavities where they may cause suppuration and later by the hematogenous route localize in the brain causing brain abscess.

SUMMARY

A case of multiple bilateral brain abscesses, secondary to bronchiectasis caused by the wedging of the lower lobe of the right lung into a pocket formed by kyphoscoliosis is described.

The causative agents isolated and cultivated from both the abscesses and the suppurating lung were *B. fusiformis* and anaërobic streptococci.

The most probable route by which the infection travelled from its primary focus was the blood stream.

¹² Jour. Infect. Dis., Vol. 14, no. 1, January, 1914, p. 144.

Society Proceedings

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MONTHLY MEETING, DECEMBER 18, 1919

The President, DR. GEORGE A. WATERMAN, in the Chair

PEARLY TUMORS OF THE BRAIN

DR. PERCIVAL BAILEY presented a case in which the tumor, located in the fourth ventricle, was extirpated, followed by complete recovery.

In the discussion DR. H. C. SOLOMON stated that among the routine necropsy examinations in the A. E. F. one was performed on a young soldier who had been killed by a gunshot wound. On taking off the calvarium a tumor mass which had eroded the skull was found. There was a definite depression in the brain and the membranes were torn. It was adherent to the skull. When examined histologically it appeared to be a cholesteatoma.

DR. HARVEY CUSHING said that in his brain tumor series there are about 500 that have been verified histologically. The two examples of these pearly tumors described by Dr. Bailey are the first that he had seen. Dr. Bailey has been through the literature very thoroughly and found only seven cases. These, however, present exactly the same kind of tumors that he has described. They are very different from cholesteatomata which are not particularly rare. There are no cholesterol crystals in these pearly tumors. They are extremely rare, the percentage of incidence being something less than 0.2 per cent. in an ordinary series. Thus the two which have appeared in this series represent about the percentage in which they should occur. As in the tradition of all clinics, these two rare cases occurred in conjunction. In general, by far the most encouraging cases are the cerebellar cases. The acoustic tumors do not do so well because there a residuum is always left. Gliomatous cysts when thoroughly evacuated are most favorable.

In his experience a case of cerebellar tumor has a better outlook than a case of tumor in any other part of the brain. In the last nine months they had had about twenty-five cases; probably 50 per cent. showed no nystagmus. In the case presented by Dr. Bailey they surmised that the tumor was in the cerebellum, and the patient had an occasional slight nystagmus, but if she had not had other symptoms it would have been disregarded. A great many of these cases have a

median cyst, and with a median cyst there is no nystagmus. If the cyst is median, there may be some static instability but incoördination of movement of the upper extremities may be absent. The most difficult point in diagnosis is to determine whether the tumor is frontal or cerebellar. It has interested him in looking over the report of Horsley's cases in the National Hospital to find in how many cases a frontal operation had been done and on postmortem a cerebellar tumor found and vice versa.

BABINSKI'S THEORY OF HYSTERIA

DR. MORTON PRINCE said that in recent years, and particularly as a result of the experiences in this war, there has developed amongst French neurologists, under the teachings of Babinski, a reaction against the classical conception of hysteria of Charcot and his school. The present concept which is in vogue, is to regard the classical symptoms such as paralyses, anesthetics, convulsive seizures, etc., as artificially manufactured by the physician or the environment through the influence of suggestion and not as essential manifestations. In this view these manufactured symptoms are identified with hysteria and consequently hysteria becomes nothing more nor less than a group of suggested symptoms. There was evidence that Babinski's teachings were having considerable influence with British neurologists who were engaged in the treatment of war psychoses in the army hospitals.

Babinski ascribes to hysteria only those "accidents" which have "the common characteristics of being capable of being reproduced experimentally by suggestion" which he avers is "capable of determining the form, the intensity and the duration of them"; and, correspondingly, they can be made to disappear by the influence of persuasion and suggestion.

In these accidents or symptoms are included convulsive attacks, paralyses, various contractures, tremors, choreic movements, sometimes irregular but generally rhythmic, troubles of phonation, of respiration, or sensibility (anesthetics, hyperesthesias), and sensorial troubles. It will be noted that the common mental symptoms, like amnesias, hallucinations, confusions, etc., have no place in this classification. From his point of view, Babinski would abandon the name of hysteria and replace it with the term *pithiatism*, from the Greek words meaning "I persuade" and "curable," which expresses, the fundamental character of these "accidents."

This conception of a pathologic state, of which the so-called troubles are only manifestations, is a sound one; but after the formulation of this definition we had nothing more of the pathologic state—only an exposition of its manifestations. This failure to keep in mind, on the part of Babinski, the conception of the pathological state, is the weak point in the edifice which he builds up. Dwelling only on symptoms he fails to grasp the essential problem of hysteria, losing sight of the

pathologic state which should be the goal or solution sought. He confines himself to certain physiological phenomena and loses sight of the fact that many of the so-called troubles which are the manifestations of the "hysterical state" are pure mental stigmata. These are not included in his group of pithiatic symptoms, *i. e.*, are not recognized as hysterical, though they can be induced in favorable subjects by suggestion. Necessarily, therefore, he fails to recognize that many of the cases which he makes use of to support his thesis were already in the "hysterical state" and manifested classical manifestations of hysteria. These cases, he supposes, though having been exposed to emotional trauma, were free from hysteria until they were later the victims of suggestion. The consequence of this lack of vision is that when he comes to his data, to show that hysteria is not induced by emotion but by suggestion, he naïvely cites cases which every clinician ought to recognize had already developed hysteria and already exhibited classical hysterical symptoms of a mental kind induced by emotional trauma, or mental stress and strain, before suggestion, even in his own opinion, had got in its work.

Dr. Prince said he had no quarrel with Babinski for insisting that certain hysterical phenomena can be suggested. Every neurologist has seen often enough examples of this, and indeed is aware that he himself has suggested such phenomena, intentionally or unintentionally. Nor can any one doubt that a large proportion of hysterical stigmata particularly those following traumatisms, have been so suggested, generally unconsciously, by the examining physician. But that all have been so suggested, or what proportion have been so suggested, is another question. Given a certain state of mind, and symptoms can be manufactured almost *ad libitum*. In such state the symptoms can be educated just as by reeducation they can be made to disappear. But what is the state of mind? That is the problem.

One cannot take any man in the street, or even any patient with organic nervous disease, such as tabes, and by suggestion create hysterical stigmata. What is the difference between the mental state of the average man in the street and that of the person who has undergone some sort of psychologic conflict, or trauma, or shock, that the one is practically immune to hysterical stigmata by suggestion and the other permits them to be created with ease? This is the crux of the problem. As a matter of fact, the hysterical state is a condition of mental dissociation accompanied by certain automatisms due to psychologic factors. The real point, therefore, is whether this state can only occur by the force of a direct suggestion or whether it may be the result of other forces, such as the discharge of an emotion, or by the repressing or inhibited force of other psychologic factors involving a complicated internal mechanism, etc. Babinski rejects emotion as a possible exciting cause and finds that suggestion is the only possible cause left. As

one of the links in the chain of his argument he contends that hysterical phenomena never appear at the moment of, or immediately after the emotional shock, when the emotion is at its height, but that always, "between the emotional shock and the presence of hysterical (pithiatic) accidents there is an intervening phase, sometimes quite long, which Charcot called the 'phase of mediation,' during which auto-suggestion or heterosuggestion have the opportunity to intervene" and induce the accidents. In support of this view he cites the observations of numerous writers who had the opportunity in this war to observe so-called "shell shock" at the front and behind the lines. Babinski seems at first to be supported by these observations, for it seems that those symptoms of hysteria which Babinski elects to call alone pithiatic or hysterical, that is the paralyses, anesthetics, etc., rarely developed at the time of the emotional shock but appeared after an interval, when the soldier had reached some place behind the lines.

A study of the reports, however, shows that the patients, apparently without exception, exhibited at the emotional period immediately following the shock, hysterical mental symptoms of a very marked character. Among the symptoms commonly described were amnesias, hallucinations, deliria, inability to respond to questions, even when attempts were made to force a response, apparent incapacity to perform a voluntary act, states of hebetude, stupor, confusional states, states allied to figures, mental dullness, irrational states, tachycardia, tachypnea and tremor.

What are these, it may be asked, with the exception of the three last (which are only the physiologic manifestations of emotion) but states of dissociation with automatisms of unregulated and uncontrolled functioning of disintegrated psychologic systems? They are from the modern point of view typical and pure symptoms of the hysterical pathologic state.

That certain symptoms like paralysis, anesthesia, dumbness, deafness, etc., do not appear until a later period may be a fact as a matter of observation, but the real question is *why* do these particular symptoms appear only later, while other and mental symptoms appear at the height of the emotional discharge? It is a question of the *why*. The fact which seems to have been brought out by observations during this war is that the hysterical state manifesting itself by mental dissociation, can be induced immediately under mental stress and strain at the moment of the emotional discharge, while certain other symptoms, in the great majority of cases, develop only after a period of incubation.

Babinski's fundamental error is not recognizing that the hysterical state is one of functional dissociation and that Dr. Prince's psychologic factor capable of producing such a dissociation, whether it be emotion of a conflict, is capable of producing hysteria. The mechanism by which individual symptoms is produced is another problem. It may be suggestion, as we all know, or it may be a very complicated mechanism which still requires solution.

In the discussion DR. E. W. TAYLOR said that nearly everyone would agree with Dr. Prince as against Babinski's attitude. It seemed to him to be clear, just as Dr. Prince has said, that for many years the fundamental idea of psychologic mechanisms which lie behind the physiologic symptoms which Babinski has described have been coming into prominence. In other words, Babinski described, whereas others have done rather more, they have tried to interpret.

DR. WALTER B. SWIFT agreed with the thesis of Dr. Prince in almost every respect, if by "disassociation" he means an entirely conscious process. The background of Babinski's original training and his experience has not been psychologic. As he is an internist, his medical attitude is primarily as an observationalist.

He was interested to hear Dr. Prince present Babinski's interpretation of hysteria as the externalization of will-processes. To him this interpretation is entirely unsatisfactory, if he means by will-processes the conscious choice that has been taught us by James. Ziehen once demonstrated in the Charité Hospital a case of hysteria that simulated tabes, and another case of hysteria that simulated multiple sclerosis. That these two cases could be nothing more than externalization of will-processes is hard even to imagine. He considered hysterical manifestations as the externalizations of a conscious lack—an absence in the conscious mentality, which lets hysterical phenomena appear in a similar fashion as the lack of the central motor neuron lets the pathologic reflexes and spasticity appear. A description of this conscious lack is what is needed in hysteria today.

FRACTURES OF THE SPINE

DR. W. J. MIXTER said that he would deal with the most important group of fractures of the spine, namely those with cord involvement. Treatment must depend chiefly on the cord lesion except in so far as the bony lesion has bearing on the cord lesion. Laminectomy with an attempt to remove the cause of injury to the cord or to alleviate the effect of such injury is, of course, the operation usually performed. In view of the pathologic considerations early operation would be indicated in these cases: (1) Partial section of the cord, (2) marked contusion or edema of the cord, (3) pressure on the cord from any cause, (4) bony injury which is likely to cause cord injury in the future, (5) severe cases of hematomyelia. Operation would be contra-indicated in the following cases: (1) Complete section of the cord, (2) moderate angulation without pressure, (3) mild edema of the cord, (4) concussion of the cord, (5) moderate hematomyelia.

* Splitting the cord according to the technic proposed by Allen may be performed in certain cases, but without great hope of a successful result. Early operation is most important and if possible should be performed within twenty-four hours if the symptomatology seems to point to any

of the pathologic changes noted above as requiring operation, the most important single indication being increase of symptoms. The care of the paralyzed patient, whether with or without laminectomy, is difficult and the most careful nursing is essential. The lessons of the war are important and the early establishment of an "automatic" bladder most desirable. The Balkan frame is often of help although as a rule a water bed is sufficient. A plaster jacket is unnecessary in most cases except where the fracture is in the cervical region.

If one is to be at all successful in this most discouraging type of surgery an early complete examination of the acute case must be made. If after careful review of the findings operation seems indicated and the patient is not in severe shock, the operation should be performed at the earliest possible moment.

In the discussion Dr. HARVEY CUSHING said that this was a most difficult subject. He very heartily agreed with most of what Dr. Mixter had said, and was glad that he was conservative about these cases. Most people are who have had a great deal to do with them. The war brought out many interesting things about spinal injuries. The mortality among the cases was very high. The first large group of cases that he saw was during a period of service with the British, particularly after coming in contact with Holmes and Sargent who had been collecting these spinal cases. One must wait until he has had an opportunity to assemble his material and study it before we can have what they have promised to give us, a thorough analysis and study of a series of cases in which every single segment of the spinal cord is involved.

The most interesting cases were the lower cervical transverse lesions. The patients had amazingly low temperatures. Men lay in the wards, conscious, comfortable and with complete anuria for a period ranging from four to five days with a temperature sometimes as low as 90° F. He saw two men, who had a high cervical transverse lesion, with a temperature in the eighties absolutely comfortable and taking nourishment.

Dr. Mixter spoke of another very interesting group of patients, and to those who had the surgical care of these patients the question which Dr. Mixter spoke of was brought up, namely, that of keeping them clean. The question of debate was "How shall the bladder be taken care of," because infection is almost inevitable. Dr. Cushing spoke of a friend in the French army who is a genito-urinary specialist and has made a study of the bladder sphincters and their action. His best friend, an aviator, fell and broke his spine in the upper thoracic region. He took care of the patient and would not let any one else touch him. He catheterized him himself with the greatest possible care. The boy died inside of three weeks of an acute surgical kidney. With every possible precaution these infections may occur. A catheter drainage

means an infection inevitably. Should these patients be left absolutely alone and let the bladder distend until it dribbles, a method very strongly advocated by the late Dr. Murphy, of Chicago, or should a suprapubic operation be done? One can make a puncture over the pubis with a split trocar so that the tube is introduced with no leaking. The method of leaving the bladder alone and letting it distend was adopted and official regulations were made that such patients should never be catheterized. However, in most instances, some one would be on the ground who would fear to let the bladder distend sufficiently and catheterization would be inaugurated. This particular point has never been satisfactorily settled but the thing behind it of particular interest to Dr. Cushing was the fact that the spinal cases, cared for in Dr. Head's special hospital, were patients who had escaped bed sores and cystitis. If they escaped from an infection, these automatic states that Dr. Mixer has spoken of usually began to appear. Some of these patients learned just what stimulus they needed to discharge their own bladder.

Of interest from the pathologic point of view are the observations that Mme. Dejerine has made of the spinal cases which have been under her care at Les Invalides. He saw there a great many roentgen-ray plates of her patients and many of these had begun to show bony deposits in the paralyzed muscle.

No more definite rules for operation can be laid down than those Dr. Mixer gave. Each case is a law unto itself. It is difficult to foretell what the injury is. The fortunate results of operation in which the recovery has not been attributable to the operation has misled many. A laminectomy is quite a difficult procedure. The patients are not in the best possible condition for an operation. If the spinal cord were as accessible as the brain, there would be a greater desire to operate for contusions. If the brain is treated surgically and the contused area removed by operation, it will recover much more rapidly. If one could get at the cord easily and clean out its area of contusion without damaging it and could do this quickly, by an operation which was not an operation of magnitude more operations would be performed. He finds that in the more encouraging cases one is rather apt to refrain from operating for many of them do well. In the more discouraging cases refraining from operating is more usual for they do badly in either case. This is a general rule to which there are of course, exceptions.

DR. WILLIAM J. BRICKLEY said that Dr. Mixer in his opinion, is absolutely right in saying hold back until sure and operate as soon as one can be sure. These cases change from hour to hour. A case of broken back is plus shock, concussion and great laceration. One wouldn't be justified in operating when the picture is that of a blow across the back, internal injury as well—for example, kidneys or intestine ruptured. He had seen ruptured bladder with broken back

two or three times. That, perhaps, accounts for some of the urinary difficulty following a case of injured cord. It will be well, therefore, not to make a diagnosis on one visit but perhaps in two hours to examine the patient again. The necropsies in some of these cases are surprising in that a small injury from the pathologic standpoint can kill a person. In other cases it is surprising to see how much movement is present with a badly damaged cord. In other words, begin at once to treat the patient. Do not forget that there is always something else besides a broken back if one can discover a broken back readily with the fingers. Usually the other injuries will have to be treated first. Get rid of the shock, investigate the ribs, the urinary tract and intestinal tract, before you operate, for if you do not the best operation will not be of avail. In civil practice one cannot just say operate, as is often possible in a hospital. When one is dealing with general practice people often simply will not permit one to do the thing which offers the best chance for the patient. They have to be convinced. The average man thinks that laminectomy is difficult. Therefore he opposes many such operations. In looking over a good many cases in industrial work he had been surprised to see what good recoveries some apparently complete paralytics have made. In two or three years they are working. We do not operate often enough on this type of case. Dr. Cushing expressed the sentiment when he said certain cases are so difficult that we do not feel like taking the risk. Dr. Buckley was interested to look up this matter because he had had many cases of injured backs that had to pass on, at one time approximately twenty or thirty cases a day, with the idea of finding out why they could not go back to work and it was discovered that many patients that were being treated for sprained back or lumbago actually had broken backs of some degree or other. When a person does not get well and has a persisting train of symptoms, it is just as well to take a roentgenogram.

DR. MORTON PRINCE said he was intensely interested in hearing Dr. Mixter and also Dr. Cushing and Dr. Brickley because he wanted to learn what the most recent modern experience has been, and what are the conclusions which, in particular, the surgeons of this war have drawn from their experiences. He wanted to see what change had taken place in the point of view. He had been much surprised by the similarity of views expressed here to those that were held in the discussions that took place twenty years or so ago. This whole discussion sounded, in fact, like an echo of similar discussions on fractures of the spine. In the course of some twenty-five or thirty years' service at the City Hospital, he had seen a good many cases and had taken the responsibility of advising operation in a good many. For a number of years he was intensely interested in the subject. He recalled that the question of the advisability of operating has come and gone in waves.

Following a time of indifference, there came a great wave of interest accompanied by the hopefulness and fervor for operating. That was just after Horsley brought out his operations on the brain. For a time this wave of hopefulness continued, and then it was followed by discouragement and pessimism. Then another group of younger surgeons came along and this group became enthusiastic, took up the subject again, and operated but with the same results. And so it has continued. As a result of his experience, he had been left with a feeling of absolute pessimism.

He did not see from what has been said here that anything has been gained by the experiences of the war to show that if the cord has been injured that anything can be done by operating to restore function. The reader's sole conclusion is that if one is going to operate, one should operate early. Of course, he does not understand that Dr. Cushing adds anything more optimistic or pessimistic.

Concerning the question of diagnosis, as to whether there is a complete or only a partial injury of the cord, the same difficulties were narrated during the years of which he spoke. It is certainly a very difficult matter to tell whether one has a complete or partial injury, and he could not see that anything has been added to the diagnostic armamentarium. The point has been emphasized by Dr. Cushing and Dr. Brickley that there are a good many cases of apparently complete and partial injury which afterward have improved, and improved decidedly, without operation having been performed. Therefore it follows that if improvement follows operation it may in no way be due to the latter. It is always a question whether it is not better to give the patient a chance to improve without operating on him.

DR. A. E. BROWNRIGG said that in a case seen in consultation with Dr. Shea of Nashua six or eight years ago, they made the following observations: The patient had fallen from a building violently buckling his back with consequent fracture. Several laminæ were removed. The dura was punctured and beneath the point of injury was a large area of fusiform swelling which proved to be a blood clot. It appeared that three fourths of the cord was severed. The operation was finished and the patient was completely paralyzed below the level of the lesion. After several years there was some recurrence of sensation in the lower extremities and also some power of movement. He has since been able to earn something by selling small articles on the street.

Dr. Brownrigg expressed himself as optimistic that the operation had been of decided value in helping the cord to unite.

DR. E. W. TAYLOR said that as a matter of fact, there is no experimental evidence whatever that the cord itself recovers, that the neurons grow through. In those instances in which this has appeared to take place, presumably the regeneration takes place through the cord that remains. Some photographs were shown illustrating the types of

lesion that usually occur. One thing that has been very striking is the fact that there is almost never any subdural hemorrhage. As a matter of fact, traumatism to the spine leads to a central hemorrhage almost always and practically never to a subdural hemorrhage, possibly occasionally to an extradural one. Less conservatism in operation owing to improvement in technic is apparently the watchword of the future.

DR. W. J. MIXTER said he thought that in fractures of the spine with or without cord lesions there are very definite surgical indications. Certain lesions definitely call for surgical procedure with a distinct hope of improvement. The great difficulty at the present time is the question of diagnosis of these lesions. Allen's work is positive in regard to the benefit that may be obtained by splitting the cord, but one cannot tell in which case the cord ought to be split. That is one of the main reasons for pessimism at the present time. He agreed with Dr. Taylor that a subdural hemorrhage is a rarity. The extradural hemorrhage seems more common, but neither of them are of particular frequent.

NEW YORK NEUROLOGICAL SOCIETY

THREE HUNDRED AND SEVENTY-NINTH REGULAR MEETING, HELD
AT THE ACADEMY OF MEDICINE, MARCH 2, 1920

The President, DR. WALTER TIMME, in the chair

PRESENTATION OF CLINICAL MATERIAL

CHRONIC NON-DEGENERATIVE HEREDITARY CHOREA

DR. I. S. WECHSLER presented a case showing a clinical picture closely resembling Huntington's disease. But certain distinctive features remove it from this category and suggest that it might be a distinct clinical entity. An American, female, married, age 36, had had peculiar movements of arms, hands, body and legs, twitchings of the face, for some sixteen years, gradually increasing in intensity for a time, then remaining comparatively unprogressive. A slight weakness of the heart, and faintness were complained of about the time of the onset, which is said to have followed a miscarriage. There were no convulsions, biting of tongue, amnesia, etc. The attacks are closely linked with the patient's emotional state, suggesting a possible hysterical condition. The patient's father, who was the uncle of her mother, also suffered from chorea for twenty years. One brother has shakings. Of her children one daughter is not nervous, but has poor eyesight and nystagmus; the second daughter has twitching and attacks of weakness. The shaking is not choreic. Two small boys have both chorea and nystagmus.

The patient shows a number of abnormal involuntary movements. Irregular, jerky, purposeless movements of whole parts, arms, legs, body, hands. Twisting of the whole body. The eyeballs wander in irregular fashion in their sockets. All these movements are intensified by emotion while control inhibits them for only a short time. The movements are in general more rapid than in chorea. No pathologic reflexes were found. Vision and hearing are normal, except for the choreic non-rhythmic movement of the eyes. Mental status perfectly normal, a slight tendency to forgetting, probably being due to lack of attention.

The oldest boy, age $9\frac{1}{2}$, at the age of seven developed a condition diagnosed at the hospital as acute chorea. The condition cleared up somewhat after six months. Two years ago there was a second acute attack which still continues.

The younger boy, six, has had slight twitchings since he was three. Slight unsteadiness in equilibratory and non-equilibratory tests, of a choreic nature, was obtained on examination. Some nystagmus on looking forward and trying to fix the gaze was noted.

Unlike the condition usually met with in Huntington's chorea the onset of the attack was at the early age of twenty. The movements are quicker, the face shows more grimaces, speech is differently affected, somewhat forced and slow but not scanning. The gait is clownish. Mental degeneration is absolutely absent. Hysteria might be adduced as a cause, especially hysteria associated with chorea, while other forms of chronic chorea such as chorea gravidarum and paramyoclonus multiplex, have some features suggestive of this case, but do not correspond sufficiently to warrant the diagnosis. The point of particular interest in this case is that it is a non-degenerative non-progressive type of hereditary chorea.

DR. SYLVESTER R. LEAHY, of Brooklyn, stated that he had seen conditions similar to that of Dr. Wechsler's patient in women of about fifty. These had paranoid and suicidal tendencies. In view of the youth of the patient, he thought that the mental symptoms that could not be observed now, might develop later.

DR. J. H. LEINER did not believe that this case came under the true category of Huntington's chorea, since the choreiform movements were entirely too lightning-like.

HYPERTHYROIDISM IN A GIRL OF NINE YEARS OF AGE

DR. MORRIS H. FRANTZ (by invitation) presented this case, which was of interest because of the infrequency of the condition in children. The patient had come to the Neurological Institute Clinic a year before. She was fidgety, would get into rages, had palpitation on violent exercise. Muscular sthenia, ocular manifestations and a distinct exophthalmus were present. Tachycardia and slight tremor of the hand were also noted. Laboratory findings negative; mental age $12\frac{1}{2}$.

The patient's father had rheumatic arthritis, the mother is at present suffering from hyperthyroidism. Goiter had been present in a maternal aunt. The child was born in a little town in Germany where goiter was prevalent. At the time of the child's birth her mother developed a goiter, and the same condition was diagnosed in the child at the age of one and a half. The condition became aggravated at the time of the emigration of the family to America during the submarine blockade.

DR. WALTER TIMME in discussing the case called attention to other glandular stigmata present, and questioned whether the case could be called one of hyperthyroidism since hypo and hyperthyroidism and hypoadrenalism all appeared to have been present at some time. The absence of lateral incisors, and the abnormal configuration of the teeth were of particular interest for the glandular study.

DR. J. H. LEINER asked whether this case might not be considered a *fruste* type since the patient was well preserved and did not show any of the cardinal symptoms of an advanced thyrotoxicosis.

DR. FRANTZ said in reply to DR. TIMME that hypothyroidism and other pluriglandular syndromes had been apparent in the patient, but that since the hyperthyroidism was the prominent feature he had placed special emphasis upon that condition.

ACUTE INFECTIOUS MYOCLONUS MULTIPLEX AND EPI- DEMIC MYOCLONUS MULTIPLEX

DR. J. RAMSAY HUNT called attention to the problem of localization of acute infections in some part of the nervous system. The varieties of clinical types in Heine-Hedin's disease, for instance, emphasized the fact that certain strains of the same infective organism might have special affinities for certain tissues of the nervous system, and thus bring about the special clinical type of reaction. Such special forms of localization of an acute infection are to be found in acute infectious myoclonus multiplex and epidemic myoclonus multiplex. The form is characterized by lancinating pains, muscular contractions and twitchings, and a delirium of toxic origin. This group of symptoms, Dr. Hunt found, constituted a well-defined clinical type of neural infection which differed from those previously recognized and was encountered both in *sporadic* and *epidemic* form.

The onset of the disease is acute and is characterized by shooting pains of great intensity in the trunk and extremities. Spinal pains are sometimes present. The pains are followed by characteristic muscle jerks, waves and twitchings [myoclonus multiplex, myokymia, and fibrillary contractions.] The contractions make their appearance first in the parts where the pains were first felt. A week may elapse in some cases between the appearance of the pains and the myoclonus and myokymia. The twitchings are bilateral, multiple, and may become

generalized. There is sometimes a tendency to localization in certain regions of the body, especially in the abdominal musculature. The contractions are quick and of short duration, individual muscles or portions of muscles are involved, but not synergic groups. Slight movements of the toes, fingers, and extremities may occur in severe myoclonic twitchings, but never to the extent found in chorea or cortical myoclonia.

There is usually a moderate fever. In some cases that proved fatal the temperature rose in the later stage of the disease. An acceleration of the pulse rate was noted, and in most cases, a delirium which varies in duration and intensity with the degree of infection. There is often marked hyperidrosis, and the degree of sweating seems to bear some relation to the activity of the myoclonus phenomena. There is no paralysis or paresis of any muscle or group of muscles; no anesthesia is encountered with the exception of occasional transient areas of hypalgesia. No ataxia and no loss of deep sensibility; tendon reflexes present and active. Rarely the knee jerks may be diminished and the Achilles jerks absent during the height of the disease. The cranial nerves show no evidences of involvement except for the myokymic twitchings. The optic nerves are normal. Skin reflexes are present and equal [no Babinski]. When abdominal myokymia was present, the abdominal reflexes were exaggerated.

Dr. Hunt had observed twelve cases of this affection in the past sixteen years; two cases were seen more than ten years ago, and the remaining ten within the last three months. The first cases were evidently sporadic, the latter epidemic. The distinguishing features, acute pain of lancinating variety, with muscular waves, and twitchings were always present. Delirium was present in eight of the cases. The myoclonus delirium was a characteristic toxic delirium with hallucinations, illusions, and transitory delusions. Restlessness, insomnia, apprehension, disconnected thought and mental confusion were present. Apathy and a tendency to stupor were sometimes met with in the late stage. In the four cases without distinct delirium there was insomnia, restlessness, irritability and excitement in this early stage and later a tendency to apathy and dullness.

That an infectious disease is here under discussion is clear from the character of the onset, the fever and delirium. Multiple neuritis and acute poliomyelitis may be excluded as diagnoses since the paralysis or weakness of the muscles associated with these diseases is absent. There is no appreciable tenderness along nerve trunks. Dubini's Disease may also be excluded since it involves paralysis. Epidemic encephalitis or lethargic encephalitis are especially interesting possibilities. The epidemic myoclonus multiplex probably belongs to this group and represents a special myoclonus type of this affection. The infectious agent of epidemic encephalitis and epidemic myoclonus multiplex is apparently the same.

The motor and sensory symptoms of the disease studied by Dr. Hunt are only irritative in character, in spite of the very severe and sometimes lethal infection of the nervous system. There is no paralysis or anesthesia, and this fact gives the disease an added interest, since the myoclonus symptom-complex is not found in other forms of spinal and neural infections.

In discussing Dr. Hunt's paper DR. CHARLES ROSENHECK asked whether any of the cases with myoclonic phenomena had subsequently developed lethargic encephalitis. In three cases that he had observed, the violent neuralgia, myoclonus, mild temperature and mental confusion were the dominating symptoms in the clinical picture. There were no demonstrable sensory changes except dysesthesia. One of these patients recovered in short time, without further incident. The others, however, after a variable time, gradually became merged into the syndrome of lethargic encephalitis.

DR. C. C. BELING, of Newark, reported that he had seen 5 or 6 cases of similar sudden onset of pain, occupational delirium and muscular incoördination.

DR. WILLIAM M. LESZYNSKY had seen several cases of encephalitis in which there had been clonic spasm of the abdominal muscles. Another patient developed a clonic spasm of the diaphragm without hiccough.

DR. M. NEUSTAEDTER reported three cases seen within the last four weeks, of undoubted lethargic encephalitis complicated with myoclonus involving the abdominal muscles in two cases and the facial muscles on the left side of the face in one.

DR. GREGORY STRAGNELL [by invitation] asked whether hiccough was a feature of the symptomatology observed by Dr. Hunt. From Canada it was reported that 50 per cent. of the persons suffering from encephalitis had a hiccough that persisted for 7 or 8 days.

DR. J. H. LEINER had had a case with diplopia. The diplopia developed 10 days after the beginning of the disease. It was diagnosed as encephalitis lethargica.

This patient had choreiform movements mostly of the upper extremity, accompanied by chewing and swallowing movements of the mouth. He also showed right sided abdominal movements.

The additional interesting features of this case were the occurrence of an additional diplopia [objects appearing one above the other] after the initial diplopia had disappeared, in which the objects appeared from side to side. Again, the appearance of an Oppenheim and Gordon reflex four weeks after the onset of the disease and also a distinct line of hyperalgesia a little below the mammary line in front and about the 7th cervical behind, together with a most distressing burning sensation in the fingers of the right hand, limited to the ulnar distribution. A Sergent's white line was persistent, showing a hypoadrenia.

In closing the discussion Dr. Hunt said that hiccough had not been a feature of the clinical symptoms observed by him. Abdominal waves were present, but the diaphragm was not affected. There was no evidence of organic disease of the brain other than delirium. He had however observed combination forms of epidemic encephalitis and myoclonus multiplex.

MEMORIAL RESOLUTIONS ON THE DEATH OF DR. E. E. SOUTHARD

By J. RAMSAY HUNT, M.D.

Mr. President: It is fitting that the members of this Society should pause in their deliberations and give expression to the loss we have sustained in the death of Dr. Southard. The news of his fatal illness in this city on the eighth of February touched us with a peculiar poignancy, as it came only a few days after his visit here as our guest. On that occasion he gave us one of those delightful evenings for which he was so justly famous, in which the subject of psychiatry was enlivened by his rare wit and philosophical mind. The memory of this occasion will always be treasured by those of us who heard him, for he was in one of his happiest moods. They are, I venture to say, but few other men in American medicine today who combine all the intellectual and personal gifts which made that address possible.

Elmer Ernest Southard was born in Boston in 1876, and at the time of his death was 43 years of age. He was a graduate of Harvard and of the Harvard Medical School, and subsequently became closely identified with his alma mater as Bullard professor of neuropathology and assistant professor of psychology. At first a neuropathologist he soon manifested an interest in psychiatry, and in 1912 became director of the Boston Psychopathic Hospital. This institution, under his leadership, grew to be one of the great centers for students of psychiatry in this country and Southard himself became a figure of national importance. He was an active and many sided man, and held the directorship of the Eugenics Record office at Cold Spring Harbor, and was also a scientific director of the psychological laboratory at Bedford Hills. It was not, however, this array of appointments and honors which made Southard a unique and growing force in medicine, but rather his personality and philosophical type of mind.

A disciple of William James and Josiah Royce he brought to medicine a mind which had been steeped and trained in the philosophical method. This, with his other gifts made him one of the leaders of his generation.

While in his later years he became a man of affairs and an organizer of repute, he never lost the simple ideals and habits of the scholar, and this was perhaps one of his strongest characteristics, and contributed so largely to his unique position in medicine.

One can measure, in a way, what Southard had already accomplished in his life's work, but like all great men he was in the making and who can foretell what large accomplishments lay ahead of him. Contemplate for a moment the loss to medicine if Sir William Osler had been struck down in early manhood while still teaching the Institutes of Medicine at McGill University, and then one can better gauge what American psychiatry has lost with the passing of E. E. Southard.

TWO CASES OF BRAIN TUMOR. WITH SPECIMENS AND LANTERN SLIDE DEMONSTRATION

DR. C. C. BELING, DR. H. W. MARTLAND, and DR. W. B. EAGLETON reported on the neurological findings, the pathology and autopsy results, and the surgical procedure respectively in two cases the first, tumor of the pineal gland, which was presented as a clinical entity, the second, cerebellar tumor, presented as a pathological and clinical entity. The first patient, a man aged 25, an experimental engineer with negative personal history, suffered superficial burns of both corneas in an explosion of barium chlorate in 1913. Recovery was complete. In October, 1918, he began to see double, and lenses and general treatment failed to produce any improvement. In March, 1919, an examination by Dr. Eagleton showed R. V. 20/100, L. V. 20/50. Marked papillitis of the right optic nerve, diplopia as a result of paralysis of the superior rectus of the right eye and a spontaneous nystagmus. There was an increasing difficulty in looking upward. When Dr. Beling examined this patient the papillitis of the right optic nerve was very marked. No deviation of the tongue or tremor. Knee jerks and plantar reflexes normal except for a slight tendency to slow reaction on the right side in the latter. May 15th the patient developed grippe and was sick from that time on. From July 1 on a dull pain on the top of his head with slight frontal headaches persisted. His mental condition seemed to deteriorate. He was often nauseated and vomited. He could walk for a short time, then his body would stiffen and his head jerk back. An operation, a left subtemporal decompression, was performed by Dr. Eagleton. The brain was under great tension, the dura widely exposed. The operation was followed by an uninterrupted recovery, and the man's condition improved, although the papilledema persisted. Several weeks later, however, greatly increased intracranial pressure was apparent. He for the first time showed a tendency to fall backward. The examination at this time showed an intense double papilledema. There was generalized tremor and profuse hyperidrosis, tonic contraction of the muscles. Knee reflexes exaggerated. Clonus of the toes. Mental state somewhat confused, he had lost track of dates, but knew the year and that he was in hospital. Cerebration was difficult and tremor was produced by attempts to answer questions.

Priapism was noted; no abnormal psychosexual phenomena. His condition became steadily worse, the tremor increased, eyes bulged, jaws were set. On November 8 he began to have convulsions in rapid succession, profuse perspiration, and began to grow cyanotic. He died a few hours later.

Slides of the Hospital history and the autopsy findings were shown by Dr. Martland. The diagnosis had been tumor of the mid brain. It was found however that there was a small psammoma of the pineal gland. An enormous dilatation of the third ventricle had resulted. The pineal gland was visible in the X-ray. Dr. Eagleton in discussing the surgical features of this case pointed out how useless further decompression would have been. The possibility of a pineal gland tumor had never been suggested, since the usual symptom of headache was lacking. Relief for the increased intracranial pressure was sought by the left-sided decompression earlier in the case, since Dr. Eagleton had come to the conclusion that the patient was left-handed. But this had no effect on the papilledema.

The second case, one of cerebellar tumor, was that of a man of forty who began to lose weight, vomited every morning, had increasing dizziness and began to see double. There were severe headaches. Examination by Dr. Beling showed slight swelling of r. papilla vertigo, ataxia, and asynergia of the right side. Deviation to the right on walking. Nystagmus with rapid movements to the left and slow to the right. Hearing was about equal. Symptoms pointed to a lesion in the posterior chamber, subtentorial pressure. There was probably a cerebellar tumor with slight involvement of the pons since the left face and hearing showed slight affection.

Dr. Eagleton noted the following phenomena: the patient showed a Romberg. Spontaneous pointing deviation of the right hand to the right; more marked spontaneous nystagmus on looking to the right. Rotation to the right produced nystagmus and possibly to the left, though whether spontaneous or induced could not be determined. Duration apparently about 18 seconds. Rotation to the left produced nystagmus of 15 seconds' duration. Deviation of both hands to the left. No dizziness in either rotation. Cold caloric in the right produced no nystagmus, no past pointing, or dizziness. Cold caloric in the left had no effect either. Nystagmus could be induced by turning the head backward, showing that tracts of the vertical canals were not functioning while the horizontal were functioning.

The tumor was thought to be pressing somewhat on both sides. Cases of this sort, Dr. Eagleton felt, where the exact nature of the tumor was not recognized were better left unoperated.

In the discussion DR. J. W. STEPHENSON remarked that in his opinion the primary operation for any brain tumor should be puncture of the corpus callosum, this being especially indicated in mid brain tumors in which condition dilatation of the ventricles is most probable. Where

large quantities of fluid are evacuated he advocated no further operation. In the absence of evacuation of fluid decompression was indicated.

In tumors in locations other than mid brain he would advise therapeutic lumbar puncture, this being particularly indicated in frontal tumors. He quoted three cases of frontal tumors relieved of their symptoms by lumbar puncture. Of course in time the symptoms reappeared but lumbar puncture again relieved. In one case seven punctures were performed at intervals of seven to ten days, the puncture being dependent upon return of symptoms. Each puncture gave decided relief.

DR. ALFRED TAYLOR advised wide removal of bone and the extensive opening of the dura in decompression cases, especially when the operation was on the left side as the speech center is more likely to be affected by limited work over it. In cases of high pressure ventricles should be aspirated. A needle inserted into the ventricle to evacuate the fluid was an assistance before opening the dura.

DR. E. D. FRIEDMAN mentioned the fact that the first patient showed an inability to rotate the eyes upward. This sign is very suggestive of lesions in the mid brain, since the more cephalad portion of the posterior longitudinal bundle controls the vertical movement of the eyes. This sign has been present in many of the cases of encephalitis seen in the present epidemic. Here too the peri-aqueductal localization or the encephalitis process was shown by this inability to rotate the eyes upward, together with oculomotor paralyses. In view of the fact that this patient had already reached maturity symptoms from involvement of the pineal body were absent. In younger individuals lesions in this area involving the pineal are associated with sexual precocity and the premature development of the secondary sex characters. The speaker has seen such a case. In this patient there were noted, along with the other evidences of a lesion in this area, peculiar convulsive seizures, with athetoid movements in the hand, without loss of consciousness. This was attributed to involvement of the nucleus ruber which lies in the tegmentum of the brain stem.

Dr. Friedman asked, with reference to the second case, whether there was any corneal anesthesia on the side of the tumor. Oppenheim mentions this sign as being extremely diagnostic of posterior fossa neoplasm. It is homolateral to the tumor and said to be due to lesion of the spinal fibers of the trigeminus which in their ascent lie very near the periphery.

DR. EAGLETON in reply agreed with the advisability of wide opening of the dura for decompression when the case demanded, but emphasized again the usual danger to the speech center, and the uselessness of decompression in cases like the first, or cases that were as far advanced as the second.

TRAUMA AND OTHER NON-LUETIC INFLUENCES IN
PARESIS

Literature, Dr. MICHAEL OSNATO said, could yield practically nothing on the question of the influence of trauma in the production or precipitation of neurosyphilis, in view of the brief time that it has been possible to diagnose the condition. From a study of the very few cases that could be included under this category at the Vanderbilt Clinic in the past 3 or 4 years since careful histories have been kept, and from Dr. Osnato's own files only 13 cases could be assembled for study. These were all proved cases, proved either by laboratory examinations or autopsy. This deficiency of cases in which trauma was an associated factor whether recognized or not, is to be noted in Southard and Solomon "Case History Series" where a few cases only are mentioned. The post-traumatic paresis usually occurs, these authors state, citing Mott's study of the same subject, after at least a week's interval, since the time required for the destruction in the brain productive of the necessary symptoms would seem to be at least that. Three months was the limit of time that Southard felt should be set to determine the influence of trauma as a causative factor. An increase in the number of cases of neurosyphilis during the war noted by the Canadian medical officers is thought to have been due to the great strain at the front, and the frequent physical injuries resultant upon being buried, etc.

A possible influence in the production or stimulation of paresis is accordingly granted by other observers. Dr. Osnato described the following cases in support of the traumatic theory. In a patient who had been struck on the back of the head 18 months before by a heavy object, mental inefficiency soon became apparent. The only mental signs at present are perseveration of thought and speech and memory defect. The physical signs of paresis are present. A second patient, in whom the trauma was emotional, had been entirely efficient and dependable in his work until he was drafted into the army. His mental reaction was like a war neurosis in every respect. After his diagnosis as a psychoneurotic and after his discharge he continued to fail and finally came to the clinic complaining of gross memory defects, 15 minute attacks of amnesia, dullness and retardation amounting almost to negativism, loss of interest. The mental picture was that of a psychoneurosis of the phobic type; a diagnosis of general paresis was made from investigation of the blood and spinal fluid. The problem of the emotional factors in the production of this condition is forcibly introduced here. The study must be speculative since the exact physiological changes that may take place as a result of fear or other emotions is not known. A third patient developed the paretic picture after a prolonged etherization. Following an operation she complained of pains in the chest, legs, and abdomen, and right upper extremity. Grave memory defects also appeared. The physical signs of tabes were

present, but mentally the patient was a general paretic. She is now under treatment and shows progressive mental deterioration, without delusions or hallucinations, however. The fourth patient had a severe attack of influenza and complained of lancinating pains in the right arm and both legs shortly after. She became depressed, slept badly, had tremor of face, hands and tongue, was ataxic, and had a moderate memory defect. The blood Wasserman and spinal fluid findings in this case were those of a cerebrospinal syphilis rather than general paresis. Before the attack of influenza she had been perfectly well. In the last patient cited the trauma had been caused by a falling plank which struck the right parietal skull and glanced off, striking the dorsal region of the spine. He was in Bellevue Hospital three days. Evidence of a depressed fracture of the right vault of the skull in the fronto-parietal region, over the Rolandic area. Left hemiplegia had developed when he left the hospital. A few days later there was unsteadiness of gait, ataxia, Romberg, typical paretic speech, stuttering, memory defect, tremor. The initial hemiplegia was undoubtedly due to the trauma. Up to the date of his injury he had worked steadily, and had shown no apparent signs of paresis.

In conclusion Dr. Osnato emphasized the fact that there are undoubted acute and chronic pathological lesions of the brain ascribable to trauma of the head. Something seems to alter the permeability of the blood vessels of the brain, thus enabling the attack of the spirochetes upon the brain tissue. In the cases described cranio cerebral injury seems to have precipitated cases of paresis or adversely influenced them. The toxin of influenza, infections, ether, may have an effect similar to trauma, while the effect of emotional stress offers food for interesting investigation. (This paper will appear in full in the *JOURNAL*.)

DR. LEAHY in discussing this paper recalled Dr. Kraepelin's statement of the fact that paretic symptoms make their appearance immediately or shortly after a head injury. Sometimes the accident results on account of the paretic unsteadiness or occurs during a seizure. Whether in head injury as is often the assumed, one has to reckon with a circumstance which favors the outbreak of paresis, cannot, in the present state of our knowledge, be either proven or argued. Macfie Campbell, in his extensive works on paresis, states that even microscopically one cannot always tell what lesions have resulted from injury and what from paresis.

Until we have more pathological evidence the questions of the influence of injury in paresis must remain unsettled.

DR. OSNATO, in closing the discussion, again dwelt upon the fact that the patients had in all cases been efficient before the injury, and thereupon developed the picture of general paresis. Aside from the acute signs of trauma in the brain, other late signs, such as gliosis, nerve cell sclerosis, were to be found on autopsy, that recalled specifically the paretic brains. The same thing might be noted in traumatic insanity.

Translations

THE HISTORY OF THE SYMBOL

BY MAX SCHLESINGER

TRANSLATED BY SMITH ELY JELLIFFE, M.D., AND
LOUISE BRINK, A.B.

(Continued from page 268)

Arithmetic called numbers, chemistry certain combinations, *σύμβολα*. The word therefore wins in science a very expressive, yet sharply delimited exact meaning, which we denote as a formula.

Finally there must still be considered the cult regulations which existed in the announcement of oracles, prophecies, auguries from the events of the external world, the mysteries with all their customs and instruments, the interpretation of the appearance of the sacrifice. Further such manifestations of the language of the gods, which the laity could not understand without priestly aid through words and the uses of speech, and the means for averting their baleful action were called *σύμβολα*. Creuzer refers to certain institutions of the popular cult to which this name was given. He mentions the deer calf hide in which the mystics wrapped themselves, further cicadas which they wore in their hair, the purple carpets on which they trod and all the figurative symbols by which hidden truth was to be signified. In the Fragments of Philochorus *περὶ μαντικῆς* [concerning soothsaying], we read that noises, sneezing, unexpected sounds, word tones, meeting with man and beast, the flight of a bird, were called *σύμβολα*. The author cites Archilochos, who makes Ceres say: *Μετέρχομαί σε σύμβολον ποιονμένη*, that is, "Giving you a sign I come to meet you," for *σύμβολα* belong to the functions of Ceres.

An essential difference between this and the before-mentioned group exists in this, that the sign which merely suggests raises itself in the next instance to one that signifies, that the mark by which a thing is known, which was leveled to a token, rose to a fore token and, since such a sign clearly and unmistakably reflected the divine will, to a portent.

The figurative use of the word is worthy of mention in regard to its history in Greek. This has left an actual precipitate which

may still be perceived. Nearest to the concrete meaning comes the picture used by Homer of the pouring of the swollen autumn streams into the valley and the confluence of the floods of the Simois with those of the Skamander, already mentioned under the discussion of the word *συμβολή*. The god brings them together, a thought to which the Greeks have given further expression, when they name various places situated at the confluence of streams *Σύμβολον*. Pausanias tells of a spot, situated in southeastern Arcadia in the country of Tegea at the coming together of the Alpheios with another river, called *τὰ Σύμβολα*. The name is expressly (VIII, 4) taken from the flowing together of a number of water sources. Elsewhere the Thracian place *Σύμβαλον* is mentioned in the neighborhood of Philippi and finally the seaport *Συμβόλον λιμὴν*, a harbor situated on the southern coast of the Tauric Chersonese. It is not unlikely that the rivers, on which the second named place lay, had a very swift course, that by the giving of the name the picture of the rushing in of the waters, which we also employ in elevated language, stood before the eyes as the root word for the place christened. Here also belongs that which is called *Σύμβολον* by Plutarch in the writing *Περὶ τοῦ Σωκράτους διαιμόνιον*. Theocritus tells in this of a walk of Socrates to the house of Andokides and to the *Symbolon*. This is to be understood, according to the statement of Judeich,²¹ as "apparently a street crossing in the northwestern part of the city, in the community of the Kerameikos [Potter's Quarter] where the market was situated." The name would here then be derived from the coming together of different streets.

The idea begins already to fill out in its intellectual content close to the manifold outer forms of *σύμβολον* at the beginning of the historical period. The word leads this twofold existence up to the fall of Greece and Rome.

In a period when society was not yet divided to such a degree as was later inevitable, the citizen united in himself so much that was professional, the intellectual horizon of the student comprised such very different fields of knowledge, that it is easily explained from this fact how one word, which fitted every phenomenon of life, was also carried over unchanged to almost all of them. The fact that it was carried through religious dogma, mysteries and mythological reminiscences brought the result that many minds were occupied with consideration of the divine order of the world. So the *συμβολον* remained the very content and expression of religion and became at the same time one of the most essential objects of philosophical speculation.

It is often represented that the Greeks, before *τὸ σύμβολον* came into common use, used as the expression for it *ἡ ὑπόνοια*. This conception rests however upon a mistake and this has been thoughtlessly extended further for *ὑπόνοια* and *σύμβολον* are scarcely to be considered as complementary, rather are almost to be called contrasts. *Υπόνοια* is the deep, hidden meaning, *σύμβολον* the outer externalization, the materialization, the visualization; *ὑπόνοια* is the fundamental thought, *σύμβολον* the open expression. The Greek philosophy, just as the Judaic theology did of the law,²² accepted a deeper meaning *ὑπόνοια* beside the external sense of the word, *ἡ τῶν μύθων ὑπόνοια* [The hidden meaning of the myths] (Proklus). Plato uses *ὑπόνοια* as the hidden meaning, Thucydides^{22a} outright as opinion, conjecture, *ἐν ὑπονοίᾳ* and *καθ' ὑπονοίαν* signify allegorically or figuratively.

Σύμβολον found acceptance through Pythagoras in philosophical terminology and occupied many of the wisest thinkers. Plato comprehended the interpretations of his predecessors in the simple formula, "One made from two." Later ones, especially the school of sceptics, denied significance to the signs. The Neoplatonists in turn carried the idea of the symbol out beyond human capacity for understanding. Thus Jamblichos pressed forward even to the so-called drastic issue *ὁμόσε δραστηκῆ* the union of divine and human activity through symbols. With his dictum that the "symbolic mode of expression should be considered as an imitation of the allegorical working of nature herself," he may be the forerunner of the literary symbolists from the end of the nineteenth century. The revealing of signs by the gods takes place *συμβολικῶς*. Pausanias gives a general description of a symbolic mode of representation and opens thereby a new territory for literary investigation. Porphyrios called the duality everywhere present in nature *σύμβολον*, in which the nature which proceeds from its opposite manifests itself. The ancient efforts which were directed earlier toward the poetry of Homer, to read a deeper meaning out of the words than they spoke, was taken up again by the sect of the Essaens with Philo the leading spirit—*διὰ συμβόλων φιλοσοφεῖν* [to philosophize through symbols]. These preliminary notices will receive fuller discussion in a later chapter.

Christian theology, receptive toward this mysticism, permitted to arise in Pseudo-Dionysius the Areopagite the advocate of *συμβολικῇ θεολογίᾳ*, [symbolic theology]. *Σύμβολον* is not infrequent as sign, distinguishing mark, portent, with various church fathers,²³ in the writings of the Barbelo-gnostics, in Eusebius and Origen. As

^{22a} *ὑπόνοια τῶν μελλόντων*, Thuc. 5, 87; Notions formed of Future Events (Liddell and Scott Trans.).

worthy of consideration is its occurrence, just once, in the meaning secret, mystical symbol which was ascribed to the soul as its supposed means of expression, in the "*Pistis Sophia*" from the second half of the third century. Gregor of Nyssa speaks of a *συμβολομαντεία* [divination from signs], Hippolytos of a *συμβολοδιδάκτης* [instruction by signs].²⁴

What has not language, adapted to ecclesiastical uses, denoted as symbol, from the ancient representations of the gods to the confessions of faith of the present day!

"Through Christianity, Latin learning, and neighborly intercommunication foreign words have pushed forward in great numbers [into German]. Not only their close connection with the traditions of church and school moved our ancestors to their acceptance, but also their ornamental quality and their adaptiveness."²⁵ If the authors in writing down these sentences have thought of much older periods when foreign words entered, then this reference covers completely the wandering in of the word symbol.

Σύμβολον had entirely stripped off its earthly garments and appeared only as an important expression of ecclesiastical life, above all in the confession of faith and the sacraments, and as a philosophical concept in the strife continually breaking out in regard to doctrinal opinions. Cyprian, bishop of Carthage from 248 to 258, first used the word in the significance of confession of faith.

The symbol of faith in the life of the church, "the briefest and most pregnant expression of the Christian view of life," according to the Catholic conception, is of a quite distinct meaning (Dörholt²⁶). Perhaps, according to the opinion of this author, the name *symbolum* would not have been chosen for this, if it had not been first found used by the Fathers. The ecclesiastical writer Rufinus Turanius (born 345) gives the following tradition concerning this: The apostles, after the descent of the Holy Ghost, before they had separated into different lands, had prepared together a brief summary of the Christian doctrine which should constitute the norm of their future preaching and be passed on to the converts as the rule of faith. This summary must have been called by the apostles *symbolum*, for a Greek word that signified also a distinguishing mark (*indicium*), that is distinguishing mark or sign of the true faith, also as a grouping together (*collatio*), that is a joint work of a number of individuals. Bardenhewer²⁷ remarks in regard to this: "Both etymologies appear again in other Latin church writers. As is known *σύμβολον* signifies a distinguishing mark, *συμβολή*, a joining together." Saint Augustine (born 353) published his tractate *De Fide*

et Symbolo and explained *symbolum* as the *Regula fidei brevis et grandis, brevis numero verborum, grandis pondere sententiarum* ["the rule of faith brief and great, brief in the number of words, great in the weight of thought"]. Moreover in the writings of Augustine the struggle begins against the old sign language, the use of which he explained as a characteristic of the Gnostics. According to Hagenbach²⁸ it signifies a formula preserved traditionally or in writing, in which all are recognized who belong to one and the same ecclesiastical party. As the symbol served originally to separate the Christian from the Jew and the heathen, so it was later used to distinguish the orthodox, the Catholic Christians, from the heretics.

A brief glance at the history of ecclesiastical symbolism which will be looked upon and treated as a special division of theological science, will be given in another place. Word and idea are to-day still full of living force, but "with the compelling authority of the symbolism of the Catholic theology fallen into uncertainty the symbolism once so diligently cherished or the figurative representation of the antitheses in doctrine is destined to die out."²⁹ A new trend in French theology showing the allegoric religious character, which Sabatier and Ménégoz have followed, is called *Symbolo-Fideismus*.

Jurisprudence formed another bridge from the ancient world to the modern in regard to the history of the word symbol. Justinian, who acknowledged himself as the opponent of the symbol in judicial life and banished it from legislation, retained in Roman law the *Traditio symbolica* which had come over from antiquity. It was perpetuated in theory and practise through all law schools and law books down to the establishment of the German civil code in the year 1900.

Only mere reference can here be made to the symbolic movement, which forms a summary of philosophy. We must point to the scholastic Neo-Latin literature, in our consideration of the history of the word, the most significant exponents of which, men like Henricus Stephanus and Casaubonus, we have already had occasion to mention. Casaubonus calls Christ "*ὁ τῶν συμβόλων δημιουργός* [The Maker of symbols]." How far away this trend of thought from the writers of the Middle Ages who employ *symbolum* for the war cry of the military leaders (*cry d'armes*)!³⁰

In the period of the Reformation *symbolum* is still foreign to wider circles, although we meet it here and there in Luther's³¹ writings, otherwise he would not have considered it necessary to supply with the word each time the German translation, faith and confes-

sion. The evangelical church learned to know it in the year 1538 through Luther writing "Die drei Symbole oder Bekenntnis des Glaubens Christi." To be sure the word had already five years earlier been admitted into the new statutes of the University of Wittenberg.

Friedrich Kluge's³² fascinating writings give us an insight into the first period of the history of the New High German language. Luther even, the boldest language reformer, did not succeed in breaking the foreign domination of the Latin cultural language. Yet Lessing himself complains much later in regard to this, that it was not permitted him to write his father in Latin. And yet Goethe again complains of the difficulties in our scientific speech.

In spite of Luther's translation of the Bible (1521-1534), in spite of his resolute intervention for the use of the German language at the Diet of Worms, the German lexicographers never once take cognizance of the word symbol; neither Simon Roth³³ (1571) nor in the next century Henisch (1616). Daniel Georg Morhof³⁴ (1682) remarks: "The Lord's prayer and the Symbolicum apostolicum [apostles' creed] was written also in 800 or even before, so it appears from the Vatican library"—"Die à la Mode-Sprach der Teutschen oder Compendiöses Handlexicon—in which the most of the words borrowed from foreign tongues" are collected by Sperander (1727, Preface worth reading), gives as the meanings in use at this time: "omen, ring, seal, password, parole, field- or counter-sign in war, confession, belief; a motto or verse which one chooses for oneself, a device, portrait, such as high potentates or other great or learned men choose for a memorial." Yet in the year 1733 Zedler³⁵ overlooked this, Steinbach in 1734. Even in the nineteenth century neither Paul (1897) nor Kluge (1883) mention it, nor does Moritz Heyne's "Deutsches Wörterbuch" in the edition of 1906. Jannsen, however, who brought out Kluge's index, mentions it among the Greek loan words.

According to Wilhelm Wundt the symbol is an esthetic idea. César Ripa³⁶ had already in 1698 used the word in his "Iconologie." How could an esthetic science created upon German soil and so zealously nurtured get along without Symbol? Its founder Baumgarten³⁷ does not know the word. Nor does his successor v. Hagedorn,³⁸ who always makes much more use of the expression *Sinnbild*, image. Karl Wilhelm Ramler who worked unremittingly in germanizing foreign words has set his stamp upon this and introduced *Sinnbilder* for symbolic images, *sinnbildlich* for symbolic [adjective form].³⁹ But Lessing shortly after this used without hesitation in

the Laokoon the German *Symbol*, his friend Moses Mendlessohn also, and indeed in the peculiar plural form *Symbole*. Wieland, to whom the germanizing of words owes so much translates it first by rule of faith. It is the regularly used tool, in addition to the allegory, for Winckelmann's pioneer labors. The contemporary philosopher J. H. Lambert speaks in the new organon of symbolic knowledge. Schiller, later Goethe, Schlegel also, have many times discussed in detail the esthetic conception of symbolism. Schlegel explained it as the essence of all art. Jonas Cohn⁴¹ on the contrary will have nothing to do with the word symbol as of value for esthetic expression, "since its etymology and cumbersome history produce an erroneous impression."

Since these times the word has never again fallen out of use. In the first decades of the nineteenth century the literary battles between Heinrich Voss and Friedrich Creuzer brought it clamorously to attention. Schleiermacher and his followers in various territories, scholars and artists, devoted their attention to it; the word was in the mouths of everyone. The "Häufigkeitswörterbuch für die deutsche Sprache" by Käding proves this by actual count. It introduces 224 citations for *Symbol* and its derivatives out of 290 books, speeches and journals taken at random.

One will be almost repelled by the frequent use of the word, who takes up to-day, only ten years later, the most recent productions of the press, daily papers and periodicals. The times remind one of those of which Fr. Creuzer wrote in the year 1809 in his Heidelberg dissertation: "The word symbol has been taken to-day as an object of use as if in competition, by those of our countrymen who appear to themselves clever only in the use of this one word."

Shall this word still be looked upon as a German word? Saalfeld translates it in the "Fremd- und Verdeutschungswörterbuch" (1898) as *Sinnbild*, *Wahrzeichen*, *Wahrspruch*, *Losung*; *Glaubensbekenntnis*, *Bekennnisschrift* (emblem, omen, verdict, countersign; confession of faith, written confession). Daniel Sanders has it as well in the "Fremdwörterbuch" as in his "Wörterbuch der deutschen Sprache." Although Weigand in 1878 "reckons it among the foreign words not yet well naturalized," Eberhardt's "Synonymisches Handwörterbuch" of 1907 mentions it as "completely naturalized and in good standing."

I could not discover anything authoritative as an answer to a question whether *Symbol* found acceptance in Grimm's dictionary. I could believe that the very frequent use which indeed Jakob Grimm makes of this word must answer the question positively, also because

it is commonly used with the sign of incorporation in the German language, namely, the adjective ending *isch*—*symbolisch*. On the other hand it appears just once where we meet it in the article “Kerbbrief” in the Greco-Roman plural form *symbola*.

Gottgeft Dehlinger’s “Deutsche Scherflein zum Sprachschatz” deprives the reader of a germanization of the word, but Fr. Vischer in the III part of *Faust* has translated *den Symboliker* by the quibbler over images (ironically imitating Heinrich Voss and F. L. Jahn), and Charles G. Davis⁴² turning in another direction translates it by grubber among images.

Hamann’s⁴³ opinion seems most proper that one can conclude from the employment of the foreign word symbol the mystic coloring of the psychic process. A later passage in the same writing sets forth in another connection that “science, which must again strip the words of their affective value, which they obtain far too easily, makes use of strange words, that is, new, unaccustomed words, which have as yet no affective value. It coins technical terms and chooses besides words from a dead language with the advantage that these cannot attain that emotional value through daily use.”

The rather obsolete *Kerbbrief*, *Kerbzettel* (*zedel*), *Kerbbholz*, tally paper, notched letter, notched stick, agree not verbally but in a certain direction in idea. The last, having earlier the same meaning as the others, is still used mostly in a transferred sense. By it was understood the parts of an object split off and separated from one another which by a fitting together of its parts must give a whole, which hid the split so that its genuineness could be seen. In a now disappearing commercial life it was used for the testing of the genuineness of documentary papers, which were cut apart with the scissors in a strangely ingenious fashion, so that the cut was not easy to imitate exactly. As this happened with passports, the similarity with the ancient custom is nothing less than striking. This practise is above all frequent still with foreign revenue papers and securities of all sorts of commercial undertakings, the forms of which must tally with the corresponding portion in the revenue or securities book without any space between. Grimm adds in explanation: “As rings were broken in two as *symbola*, of which each party took a part for himself.”

(To be continued)

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Alvarez, W, C. SO-CALLED AUTOINTOXICATION. [J. A. M. A., Vol. 72, p. 8.]

We speak of certain drugs as stimulants or depressants to the intestine writes the author, taking for granted that their effects are uniform from one end of that long tract to the other. It has been recognized, however, that some purgatives affect one part of the bowel more than others. Alvarez has studied the effects of seventy-six drugs on segments excised from five different parts of the rabbit's bowel. Some affected these segments about equally, while others affected them unequally and even dissimilarly. A number produced effects more or less graded from one end of the bowel to the other. A few stimulated the muscle at one end and depressed it at the other. If, as the author believes, the downward progress of material through the tract is dependent upon a gradient of muscular activity, drugs which tend to steepen that gradient might act as purgatives and those which tend to reverse it might act as emetics. It is suggestive that among the drugs whose action on the excised segments indicated a steepening, there were a number of purgatives; and among the drugs which would tend to reverse the gradient there were a number of well-known emetics. [Author's Abstract.]

Sunz, R. CONSTITUTION AND STOMACH DISEASE. [Med. Iberia, Vol. 7, No. 80.]

Asthenia, as a polyglandular syndrome, the author states, is found in over 70 per cent. of his patients with chronic stomach affections. Vagotonic symptoms are present in more than 30 per cent. of all these chronic stomach cases. Large doses of epinephrin fail to induce the usual reaction, while atropine modifies the bradycardia for a limited space of time only. Suprarenal treatment, rather than stomach treatment is called for in these cases, especially when violent contractions follow the evacuation of the stomach and eating of food relieves the pain. This is a very widespread disorder and makes up the great bulk of his patients. The psychogenic factors causing the vagotonic he does not touch upon.

Gomez, S. M. GASTRIC EPILEPTOID CRISES. [Arch. Esp. d. Enf. d. Ap. Dig., Aug., 1919, J. A. M. A.]

Martínez describes the case of a man of 39, a gardener, apparently robust, who for three years had had attacks of pain in the stomach accompanied by great depression and sometimes by loss of consciousness and convulsions. During the intervals he felt well but said he had always had "a delicate stomach." The pain during the attacks was agonizing at times, and it reappeared each day for three days; then followed a free interval of about three months on an average. By exclusion, the only diagnosis possible seemed that the attacks were a manifestation of tardy epilepsy. In time the gastric symptoms grew less pronounced while the epileptic character of the seizures became unmistakable. No treatment addressed to the stomach had the slightest effect and the ordinary bromids were not borne well by the stomach, but considerable relief was obtained with strontium bromid which seemed to be well tolerated. The intervals grew longer and the seizures less severe. The fetid breath and large amounts of indican in the urine just before the seizures were combated with dieting, laxatives, hexamethylenamin and sodium benzoate by the mouth.

Ceresole, G. CHOREIC MOVEMENTS OF ESOPHAGUS AND STOMACH. [Gazz. d. Osp., Sept. 11, 1919.]

Ceresole describes the symptoms occurring in a weakly, nervous man who showed irregular choreic movements of the esophagus changing about from point to point with peristalsis and antiperistalsis occurring irregularly and simultaneously. Similar irregular movements occurred in the stomach with spastic closure and relaxation of the pylorus and the cardia. During the time of these convulsive movements the abdomen and the movements of the diaphragm were regular and normal. This localized choreic-like activity dated from childhood, and did not cause pain or vomiting or impair the health. The author seems unaware of a wide discussion of this type of phenomena in psychiatric literature.

Gundelfinger, E. INFLUENCE OF THE NERVOUS SYSTEM ON THE CAUSATION OF ROUND ULCER OF STOMACH. [Mitth. a. d. Grenzgebiete d. Med. u. Chir., 30, pt. 2.]

This paper dealing with the clinical material of Gerhard's clinic in Würzburg analyses the anamnestic details of 1,184 cases of round ulcer. In over 20 per cent. of the cases a striking series of observations stand out showing the participation of the nervous system. This is chiefly manifest as increased vegetative (autonomic) tonus. Bradycardia, cardiac beating, respiratory hunger, with stomach cramps, increased secretions of sweat and saliva, dysmenorrhea, pylorospasm, cardio-spasm, hyperacidity, obstipation, alternating with so-called nervous

diarrheas; these were the most frequent of the definite syndromes in the anamneses, and in the author's opinion gave very definite support to the neurotic etiology of this disorder. Experimental work upon the vagus, by subphrenic vagotomy, vagotomy in the neck, stimulation of the nerve trunk of both sides, also of the celiac ganglion, with unilateral and bilateral removal of the same, was carried on, the different variables being tried out. No modifications of the stomach or duodenum seemed to follow the vagus involvement but implication of the celiac ganglion induced changes in the stomach and duodenum similar to those induced by ulcer. By reason of the cutting out of the sympathetic stimuli an excess vague reaction becomes manifest in the autonomic arc and thus confirms the idea of heightened vagus tonus as causative of the ulcer. [J.]

Udaondo, C. VAGOTONIA AND CHRONIC CONSTIPATION. [Arch. Esp. des Enf., June, 1919.]

Spastic constipation is here studied as one manifestation of general overexcitability of the autonomic nervous system. This vagotonia shows in various ways, with intermittent involvement of different organs (Eppinger and Hess, localized vagotonia) and spastic constipation, isolated or combined or consecutive as one of the manifestations. Treatment should be through the nervous system. He has been most successful with atropine but seems unaware of the anal erotic components so frequently observed by those who go beneath the superficial and trivial.

Bourcart, M. PATHOGENESIS OF GASTRIC AND DUODENAL ULCER. [Rev. Med. d. l. Suisse Romande, May, 1919.]

A careful study of a series of cases Bourcart says will show that those with ulcer of the duodenum or stomach are all characterized by more or less sagging viscera and flabby muscles. The result apart from the original etiological factors is a loss of abdominal balance, and the circulation of the nerves suffer. Vagotonia or sympathicotonia is present. In breathing the lower part of the chest scarcely moves. The ptosis, faulty attitude and shallow breathing combine to hamper the circulation. Deep breathing expanding the lower ribs, drawing up the abdominal muscles, erect and reclining, and massage of the abdomen aids in restoring the viscera to place and maintaining them. In other words the treatment aids the visceral morale, hence is really psychic.

Fisher, H. MIGRAINE. [Br. Jl. Ophth., June, 1919.]

In addition to the classical symptoms of scintillating scotoma, headache and vomiting, two others, namely, (1) a marked reduction in the pulse rate, (2) polyuria are here discussed. The migraine spectrum lasts for about twenty minutes. The migraine spectrum he believes is produced by irritation of the visual nerve fibers at the base of the

brain. The inter-peduncular space is the only region where such a condition can arise, explaining the varieties of the migraine scotoma. The author makes the suggestion that the variation in the size of the pituitary is the exciting agent of migraine. Slight swelling of the hypophysis would exert sufficient pressure to irritate the visual fibers in any of the required positions. The cessation of migraine during gestation, the climateric and after the age of about 50 in males is very suggestive. Headache, slow pulse and vomiting indicate intra-cranial pressure, and swelling and over-activity of the hypophysis through the choroid plexi might well cause it. The author is treating some migraine subjects by glandular therapy. He suggests that decompression at the *sella turcica* would probably be efficacious.

Weeks, J. A. GLAUCOMA. [*Journal A. M. A.*, Oct. 11, 1919.]

The author gives his impressions as to the various forms of glaucoma seen in thirty-two years of active practice in ophthalmology. The principal determining causes, as he regards them, are (1) obstruction to the outflow of fluids from various causes which he enumerates, such as inflammatory products from numerous causes; (2) sclerosis affecting the lymph spaces at the sclerocorneal junction as in buphthalmos or after interstitial sclerokeratitis; (3) increase in intra-ocular secretions, and (4) retention of aqueous in the posterior chamber. In idiopathic glaucoma very marked changes in tension may occur. He has seen as much as 10 degrees between the two eyes, both above normal, and on the following day down to normal again. The miotics employed are, of course, pilocarpin and physostigmin, and as adjuvants jaborandi is used internally, opium at times and also free catharsis. At least 90 per cent. of patients with idiopathic glaucoma, except in infantile cases, give a history of chronic constipation, the relief of which goes far to relieve hypertension. Miotics have been employed as a preventive as well as a corrective in many cases in which the tension is near the upper limit of normal, the anterior chamber shallow, and in which there is even slight cupping of all or a part of the disk—pilocarpin used once a day at night on retiring. His routine practice is to test the tension first by digital palpation, and if hypertension appears present or probable a tonometric measurement is taken. If the tension is above 25 by the Schiötz' tonometer, miotics are resorted to, attention being also given to the field of vision for form and colors and the degree of vision determined. It has been possible in many cases of "idiopathic" glaucoma to put the tension at about the upper limit and keep it there without deterioration or loss of visual fields. Miotics are useful in hypertension after cataract, and may relieve it permanently to a great extent. As regards dosage, he begins with pilocarpin in a 0.33 per cent. solution twice daily, increasing it in dosage and frequently according to necessity up to 2 per cent. as frequently as required, or

changing it to physostigmin solution (salicylate as a rule) in strength from 0.1 to 5 per cent. In secondary glaucoma the effects of miotics are seldom so marked as in the idiopathic cases. Reduction is not so easy to be obtained or to be maintained. For many years he has made a practice, when possible, to try miotics in all cases of hypertension before advising operation. A diminution in the field of form or colors is an urgent sign, as is also a slight positive diminution of vision. Experience teaches him that early operation is desirable and small retinal hemorrhages do not contraindicate if other conditions are urgent. The sort of operation must be determined by the case. Buphthalmos and other forms of infantile glaucoma are not as a rule satisfactorily treated with miotics, but exceptions occur. In buphthalmos paracentesis may be resorted to early in the condition, and if followed by miotics may often have a good result. When the patient has reached the age of from 4 to 8 years, trephining is the operation of choice. Neither iridectomy nor the Lagrange operation in buphthalmos is satisfactory because of the extreme thinness of the cornea and the difficulty of obtaining a filtering cicatrix without endangering the contents of the globe. The opening has a tendency to stretch and a large trephine should not be used. When, in infantile glaucoma, the globe is not enlarged some other form of operation may be used. Secondary glaucoma after cataract abstraction has been seen by him in about 4 per cent. of the cases, in some of which the capsule of the lens seems to be the cause. In a few cases, after a cataract extraction, the iris on one or both sides of the coloboma has become incarcerated in the angle of the wound and hypertension has developed afterward. If the anterior chamber is opened at a suitable place, and the columns of the coloboma on the incarcerated side are freely divided the hypertension will be relieved in most cases. He mentions other measures that may be taken to relieve this condition in special cases. In secondary glaucoma with acute or subacute iritis, the hypertension will usually subside spontaneously in a few days. At times operation (paracentesis) once or more made at the limbus will be sufficient. The secondary glaucomas following sclerokeratitis or interstitial keratitis are not usually relieved by simple iridectomy. A filtering cicatrix must be obtained in virtually all chronic cases with deep anterior chamber. Other particulars as observed by him are briefly noticed, and he says that ophthalmology owes much to Colonel Elliot and Professor Lagrange for the operations they have advocated, and he gives his experience with these operations. In using the Lagrange operation, the after-treatment is very important, daily massage beginning after operating if the tension is not subnormal and continuing a few days or weeks if necessary to obtain a filtering cicatrix.

Dunn, J. PUPIL IN GLAUCOMA. [Archives of Ophthalmology, March, 1919.]

Dunn first contrasts the pupil in acute and chronic glaucoma. In the former the dilated pupil responds neither to light direct, or consensually nor in accommodation. It is immobile. This condition is the result of pressure against the root of the iris and mechanical stretching of the sphincter pupillæ. This may change on recovery. In a case of chronic glaucoma with a blind eye and high tension, the pupil was equal to its fellow, did not respond to light directly, but responded consensually and in accommodation. It did not, however, provoke consensual reaction in the good eye. It is the latter condition that the author is considering. In the case of another patient, the glaucomatous eye had perception of hand shadow. The pupillary condition was similar to that of the patient mentioned above, with the exception that light thrown into the blind eye did provoke consensual reaction in the other. This, the author advances, must be regarded as evidence of his views already expressed regarding the Argyll-Robertson pupil, viz., that activities aroused within the retinal pigment layer following impact of light on the retina, must, without traveling toward the center along the optic nerve, be directly transmitted to the ciliary region and ciliary ganglion, from which motor impulses are sent out resulting in contraction of the pupil. Thus it appears that in simple chronic glaucoma there comes a time when the intra-ocular pressure is so great that it obliterates the normal activities of the retinal pigment cells, before all function in the overlying retinal cells is destroyed. In the case of the second patient when light was thrown upon the retina of the left glaucomatous eye (the sound eye being covered) there was no primary pupillary response. When light was thrown on the retina of the left glaucomatous eye and the sound eye was open, there was consensual pupillary reflex in the sound eye, and light impulses passed along the optic nerve to the right third nuclei with sufficient force to cross to the left third nerve nuclei and awaken a response in the left pupil. From these facts it must follow that light passing centralwards along the optic nerve is incapable of producing the primary pupillary reflex. A further case demonstrates this fact, that though the primary pupillary reflex may be absent the pupil need not be widely dilated. In this patient the other eye had been removed, and the partial dilatation was due to the fact that the retinal pigment was not entirely destroyed and continued to exercise its tonic influence over the ciliary ganglion. In the case of a fourth patient the nerve heads were snow-white and the vessels were almost entirely obliterated. She could count slowly fingers a foot away. Her pupils were dilated *ad maximum*, were totally irresponsive to light, but contracted when the patient looked at the tip of her nose. In her case the retinal pigment layer was destroyed from lack of circulation in the retina, and hence exercised no tonic influence over the ciliary ganglion. [Austr. Med. Jr.]

2. ENDOCRINOLOGY.

Etienne and Richard. THE INFLUENCE OF BOMBARDMENT ON GLANDS. [Rev. méd. de l'Est, October, 1919.]

The frequency and violence of the bombardments of Nancy gave them an opportunity for studying the action of war emotions on the glands, especially of internal secretion. They were impressed with the frequency of amenorrhea in Nancy as the result of bombardment. Cases had also occurred in Paris under similar circumstances. The close association of the function of the mammary glands with that of the ovary was shown by a diminution, and sometimes by a suppression, of the secretion of milk following the emotional stress. Two cases of transient glycosuria of sudden onset are described. Its occurrence is attributed to an excessive secretion of adrenalin, caused by emotion acting on the glycogenic function of the liver by means of the abdominal sympathetic. Numerous cases of hyperthyroid activity disease were observed, which were due either to a sudden violent emotion or to a succession of frequently repeated emotions.

Little, E. S. G. ADIPOSIS DOLOROSA. [Br. H. Dermat and Syphilis, April, 1919.]

The patient was a stout woman, aged 54 years. She had previously been addicted to alcohol. The condition had existed for about seven years. She complained of tumors, which increased slowly. At the time of examination there were two tumors situated above each elbow. They were pad-like masses forming pendulous swellings. Their surface measurements were about 20 cm. by 15 cm. They appeared to be diffuse lipomata, without any discrete nodules. The skin was of a dark violet redness. The tumors were cold to touch. There were two smaller tumors of similar tissue on the back of each wrist. The tumors were painful and disturbed her sleep. The diagnosis of Dercum's disease (*adiposis dolorosa*) was based on the symmetrical arrangement, the typical diffuse pad-like swellings and the associated pain.

Krabbe, Knud H. THE POSSIBILITY OF ABORTIVE FORMS OF MONGOLISM IN CONGENITAL HEART DISEASE. [Bibliotek for Læger, 1919.]

The author publishes a case of congenital heart disease which showed slight signs of mongolism. He discusses the possibility of the existence of abortive forms of mongoloid idiocy. [Author's abstract.]

Fici, V. MULTIPLE ENDOCRINE DISTURBANCES. [Riforma Medica, Sept. 13, 1919. J. A. M. A.]

Fici entitles his article "Sindrome pluriglandular," as the woman of 33 presented unmistakable evidences of deficient functioning of the suprarenals, pituitary body and ovary, along with status lymphaticus, and the spleen was much enlarged. None of the symptoms was pro-

nounced enough to classify the case as one of Addison's disease, etc., but the combination of the whole was grave and proved fatal in about seven years. She ascribed the beginning of her disturbances to sorrow over the loss of her child. The severe headaches and the rebellious eczema of the legs were evidently traceable to the pituitary and the endocrine anomalies. There was no reaction to injections of pituitary, ovary or thyroid, and only slight to epinephrin, but there was a good reaction to atropin and also a partial reaction to pilocarpin (no sweating); none to tuberculin. The tendency to vomiting, diarrhet and chronic bronchitis of the asthma type suggested vagotonia, and produced by emotional causes. [Ed.]

Farmachidias, C. B. PLURIGLANDULAR ENDOCRINOPATHY. [Rif. Med., Sept. 27, 1919.]

This patient, a man of about 20, showed symptoms showing deficient functioning in several of the endocrine glands, the suprarenals in the foreground. The Wassermann reaction was repeatedly negative, and there was no history of venereal disease, but under tentative mercurial [mercury is a profound sympathicotonic drug and causes marked reactions in vagotonic, hypoadrenal, conditions] treatment the symptoms gradually disappeared and earning capacity was permanently regained.

Zuckerstein. STUDIES ON ANTAGONISTIC NERVES—XIII. THE EFFECT OF ADRENALIN ON THE VESSELS OF VARIOUS SECTIONS IN THE KIDNEY OF THE FROG AND THE POSSIBILITY OF VARIATION OF THIS EFFECT. [Zt. f. Biologie, 1917, Bd. 67, H. 7, 8.]

The author was able to show that sections of the glomerulus of the frog's kidney could be stimulated by adrenalin, whereas the vessels of the circular canals were not affected by the strongest adrenalin solutions. The latter are accordingly not sympathetically enervated. There is a marked difference in the innervation of vessels in the same organ, which has a functional significance.

Calcium-free solution of chloride circulated through the vessels of the glomerulus region removes all contracting effect of adrenalin, while barium chloride contracts the vessels still further.

After severing the renal nerve, adrenalin has primarily an expanding effect even in large doses.

The phenomena noted by Pearce are accordingly not proved in the new vessel area.

Furthermore a new indication is found that adrenal does not attack contractile substance itself. In the course of nerve degeneration, peculiar conditions of stimulus of the nerve end organs are developed.

Hartman and Lang. THE ACTION OF ADRENALIN ON THE KIDNEY.
[Endocrin, 3, 1919, 321.]

Volume changes of the kidney were observed in cats and dogs under the influence of ether. When adrenalin is injected into the general circulation, small doses cause constriction while larger amounts cause constriction frequently followed by dilatation. While the kidney with intact nervous connections was being perfused, injections of adrenalin into the jugular vein caused dilatation of the kidney. This was sometimes preceded by constriction. Injections into the perfusion fluid produced a similar effect. Painting the semilunar ganglion caused dilatation of the kidney if the solution was not too strong, otherwise constriction might result. Painting the dorsal root ganglion usually caused dilatation of the kidney but occasionally produced constriction. This research demonstrates therefore that adrenalin can produce dilatation by its action on either the semilunar ganglion, dorsal root ganglion, or on some structure in the kidney. Likewise constriction can be produced by adrenalin acting either on the semilunar ganglion, dorsal root ganglion or structures in the kidney. [Author's abstract.]

Zimmern, A. EFFECTS OF THE X RAYS ON THE ENDOCRINE GLANDS, IN PARTICULAR THE ADRENALS. [Bulletin de l'Académie de médecine, June 10, 1919.]

The author states that while the seminiferous cells of the testes are very sensitive to the X-rays, even the interstitial cells in this organ are more sensitive than the cells of ordinary externally secreting glands. We have as yet only a vague conception of the relative sensitiveness of the gonads, thymus, pituitary, and adrenals, but undoubtedly the normal cells in these organs can, with sufficient doses of the X-rays, be profoundly influenced. Thus by treatment of the exposed rabbit thyroid effects similar to those of thyroidectomy were produced, and Regaud and Crémieux with large doses induced permanent absorption of the thymus. The sensitiveness of endocrine organs to the rays seems to be increased by disease of these organs, as illustrated in the effects obtained in thymic enlargement in children and in gigantism, in both of which affections some successful therapeutic results have been recorded. By exact adjustment of the rays over the adrenals in dogs, the author induced definite effects in these organs without harming the skin or kidneys. A marked cytolytic effect was produced in the zona fasciculata; a somewhat slighter effect in the zona reticulata, and little or no effect in the glomerular layer. In man, weaker doses were used in patients with adrenal overactivity manifested in permanent hypertension with its accompanying symptoms. Nearly always the procedure induced a reduction of blood pressure beginning in two to ten days and ranging in extent from twenty to forty millimeters of mercury. In two instances the systolic pressure was lowered by seventy and eighty

millimeters, respectively. The duration of the reduction varied in different patients, but in some it persisted several months. X-ray exposure of the adrenals deserves a place in the treatment of hypertension.

Fournier, J. C. M. ADDISON'S DISEASE AND THE WHITE LINE PHENOMENON. [Bulletins et mémoires de la Société médicale des hôpitaux de Paris, March 13, 1919.]

The author reports the case of a girl of eighteen who ceased menstruating and showed some loss of weight. One month later she suddenly began to experience severe pains in the lumbar regions, radiating to the anterior abdominal surface and even to the thighs, which compelled her to walk with her body bent forward to avoid jarring and pain. By the eighth day the pain was so severe that she went to bed. There was also slight headache. Next day there was vomiting, followed by profuse diarrhea. Upon admission to the hospital the patient was found emaciated and exhausted; temperature normal; tongue dry; pulse rate, 120; systolic blood pressure, ninety; diastolic, sixty; abdomen retracted and slightly tender; tenderness more marked over the lumbar region. The skin was for the most part pale, but the areas covered by the corset and garters were markedly pigmented, as were also the scleræ of the eyes. The oral mucous membrane showed two small pigmented spots. A distinct white line on the skin appeared in ten to fifteen seconds and lasted three or four minutes. Tests of the vegetative nervous system with pilocarpine, adrenalin, atropine, alimentary glycosuria, and Aschner's reflex gave normal results, save that neither injection of .003 gram of adrenalin nor ingestion of 200 grams of glucose brought on glycosuria. The patient was given forty drops a day of the one in 1,000 adrenalin solution. Under this treatment the main symptoms disappeared in twenty-four to forty-eight hours, including the vomiting, diarrhea, and pain, and the pulse rate dropped from 120 to eighty. General bodily vigor returned, the systolic pressure rose to 120 and the diastolic to ninety, and the white line phenomenon could no longer be elicited. The only residual disturbances were the pigmentation already mentioned, a condition of instability of the pulse—the rate rising to 130 or 140 on exertion, or even spontaneously—and evanescent lumbar pains. In nine of 250 other patients suffering from various disorders was the white line phenomenon positive. In all cases of influenza associated with low blood pressure and adynamia, however, the author had obtained the white line, which became less distinct and later disappeared under adrenalin treatment. The author believes these observations support Sergent's view of the value of the white line as an indication of adrenal insufficiency.

Motzfeldt, K. ADDISON'S DISEASE WITHOUT BRONZING. [Norsk Magazin for Laegevidenskaben, April, 1919.]

The author calls attention to the fact that Addison, in his classical description of the disease associated with his name, put discoloration of the skin at the end of the list of distinctive symptoms. Yet this discoloration has come to be regarded as the most essential characteristic of Addison's disease. The following case shows how slight the discoloration of the skin may be even in a case terminating fatally, and it is also instructive as showing that, contrary to the generally accepted view, the carbohydrate tolerance may be very slight. A woman, aged 43, came of tuberculous stock, and had been treated for a year in hospital for spinal caries when she was 20 years old. Since the age of 33 she had suffered from bouts of abdominal pain, which had sometimes been so severe as to confine her to bed. At the age of 43 she suddenly developed headache, vomiting, and diarrhea, for which she was admitted to hospital. She was pale and flabby, and the pulse was very small, otherwise the examination was negative. The diarrhea soon ceased, but the headache, nausea, and vomiting persisted. After she had been a short time in hospital it was noticed that the backs of her hands were a trifle more brown than normal, otherwise there was no abnormal pigmentation of the skin and mucous membranes, and this slightly dark tint of the hands did not deepen in the further course of the case. Asthenia and debility increased, her eyes were sunken, and the radial pulse was rapid and small, often barely palpable. The blood pressure (Riva-Rocci) varied from 60 to 90 mm. of mercury. The temperature was uniformly subfebrile. She vomited a large proportion of the 100 grams of grape sugar given in 250 c.cm. of tea, yet the urine two to five hours after contained 0.5 per cent. of sugar. Adrenalin given by the mouth proved inert; injected hypodermically three times a day for several days, the dose being 0.5 c.cm. of a 1 in 1,000 solution, it appreciably reduced her lassitude and nausea; her pulse also became stronger. Control injections of saline solution were perfectly negative. With the cessation of the injections she quickly relapsed, and she died a few weeks after admission to hospital with signs of progressive marasmus. The diagnosis of Addison's disease was confirmed by the necropsy, which showed bilateral caseous tuberculosis of the suprarenal bodies, not a trace of the normal suprarenal tissue being demonstrable, even on microscopic examination. The tuberculosis was strictly confined to the suprarenals, and there appeared to be nothing amiss with the other endocrine glands. Gall stones were found, as well as considerable pigmentation of the mesentery and the mucosa of the intestine. The author suggests that this case bears out Nensser's contention that melanoderma is a manifestation referable to the sympathetic system, and conspicuous by its absence when the disease is strictly limited to the suprarenal bodies.

Rous, P., and Wilson, G. W. ADRENALIN ACTION. [Jl. Exp. Med., Feb., 1919.]

Peyton Rous and G. W. Wilson have made a study of the influence of ether anesthesia, of hemorrhage and of plethora upon the vaso-constriction produced by the injection of minute amounts of epinephrine. Adrenalin is used with more or less success to raise the blood-pressure in conditions of collapse. The authors have sought to ascertain the dose of adrenalin requisite to bring about a particular increase in the blood pressure under different circumstances. The experiments have been made with dogs and rabbits. The solution of epinephrine (Parke, Davis & Co.) has been introduced into the external maxillary vein. A dose of 0.5 c.cm. of a dilution of one part in 1,000,000 saline solution raised the blood pressure in normal rabbits about 15 mm. mercury. This dose is called the minimal stimulative dose. While morphine and paraldehyde had no influence on the effects of epinephrine, ether anesthesia abolished the action of a single stimulative dose and diminished materially the action of ten doses. Hemorrhage has much influence in lessening the change in blood pressure after the injection of epinephrine. Whenever the hemorrhage was sufficiently extensive to lower the blood pressure, at least four stimulative doses were needed to alter the blood pressure. Sometimes ten doses were required to exhibit any pressor effect. With 100 doses the response was practically similar to that seen in normal animals. If the animals were bled, tested with epinephrine and injected with the blood that had been removed, the response to epinephrine returned in proportion to the degree of restoration of the blood pressure. When, however, the depletion of blood had been maintained so long that the blood pressure did not return to the previous level upon the injection of blood, there was permanent impairment in the response to the introduction of epinephrine. Some investigation has been carried out on the influence of plethora produced by the transfusion of citrated whole blood or of 7 per cent. gum acacia solution. The response was lessened in proportion as the blood pressure was heightened by the transfusion. The authors had hoped that they might demonstrate the utility of intravenous injections of minute quantities of epinephrine in the detection of diminished volume of the blood in patients suspected to be suffering from the effects of hemorrhage. It is often impossible to distinguish clinically between collapse due to lessened volume of the blood and that due to shock or to an extending infection. An approximately normal blood count may be obtained in exsanguinated soldiers within a few hours after receiving a wound. Since the authors have found that so many circumstances effect the response to epinephrine, they are dubious as to the practical utility of the injections.

Cowie and Beaven. ON THE CLINICAL EVIDENCE OF INVOLVEMENT OF THE SUPRARENAL GLANDS IN INFLUENZA AND INFLUENZAL PNEUMONIA. [Arch. Int. Med., 1919, xxiv, 78.]

These authors were impressed by the fact that the most striking and most constant symptoms of influenza (asthenia, prostration and low blood pressure) are also the cardinal symptoms of adrenal disfunction. Other symptoms common to acute suprarenal insufficiency and influenza are nausea, vomiting, epigastric and appendicular pains, pains in the back and tenderness on pressure over the back muscles. The question which arose was: Is there a causal relation between adrenal disfunction and the characteristic symptoms of influenza. The evidence on which the authors base their answer may be summarized as follows: Pathological: Of 70 necropsies on patients dead of influenza six showed hypoplasia and one atrophy of the adrenal bodies. Tests for suprarenal deficiency: Blood pressure determinations were made on 25 members of the S. A. T. C. In the 20 uncomplicated cases the average systolic blood-pressure was 115 mm. Hg.; in the five pneumonias it was 99. These results are useful only in view of the ages of the patients (twenty to forty), for in typical adrenal insufficiency much lower blood pressure is the rule. In suprarenal insufficiency, but not in health, there is a rise in blood pressure after prolonged administration of epinephrin. In influenzal pneumonia a similar rise follows the intravenous injection of 10 mg. of adrenalin four times a day for three successive days. In one case the effect was quite marked, the blood pressure rising from 119 to 131. In suprarenal insufficiency the intramuscular injection of 1 mg. of epinephrin causes a rise in blood pressure which may or may not be greater than in the normal individual, but which is always maintained for a longer period. In influenza, whether complicated by pneumonia or not the rise may be sustained for as long as seven hours instead of the normal one or two. Tests for endocrin disfunction: A common but not invariable feature of certain endocrin diseases is hypoglycemia. In influenza, complicated or uncomplicated, the blood sugar was always within the normal limits. In endocrin disfunction the intramuscular injection of 1 mg. of epinephrin causes a rise in blood sugar which persists for more than the normal hour or two. In influenza and influenzal pneumonia the increase in blood sugar may last for more than seven hours. In endocrin disturbances the ingestion of glucose, 1.75 gm. per kilo of body weight, causes an increase in blood sugar, which does not reach normal for three or four hours, while in normal individuals it returns in two hours. In influenza the blood sugar did not reach the normal within three hours, but did at the end of the fifth. There thus seems to be good evidence for the assumption that the asthenia, prostration and low blood pressure of influenza and influenzal pneumonia are related to suprarenal disfunction. If such be the case the rational treatment of

influenza is the administration of epinephrin. A series of cases received ten or fifteen minims of adrenalin intramuscularly every four hours four times a day. Almost invariably symptoms of epinephrin intoxication appeared—palpitation, nervousness, headache, increased lassitude, twitching, rise in temperature and increase in rate of pulse and breathing. The treatment was therefore abandoned and the conclusion reached that the intra-muscular injection of epinephrin was of little, if any, benefit in influenza. According to the authors the explanation of the failure of treatment is to be sought not in the epinephrin, *per se* but in the method of administration, and the problem which awaits solution is the discovery of the proper method of administering epinephrin.

Machennan, A. SUPRARENAL TISSUE IN HERNIA WALL. [Surg. Gyn. Obstet., Vol. 29, No. 4.]

MacLennan found in six cases of inguinal hernia occurring in children, small one-eighth inch nodules, embedded in the wall of the sac. The sacs have been with one exception acquired ones. One was a congenital hernia. Microscopic examination of these nodules proved to be suprarenal tissue.

Pirie, G. R. HYPERADRENALISM AND PYLORIC STENOSIS. [Lancet, Sept. 20, 1919. J. A. M. A.]

Pirie suggests that the spasm inducing hypertrophy of the pylorus is primarily due to hyperadrenalism before birth, and that other subsidiary postnatal causes determine the persistence or recurrence of the spasm. This condition is due to a lack of balance between the secretions of the various endocrine organs in the process of their development and involution, which may result either in a relative or an absolute hyperadrenalism. The amount of hypertrophy present at birth is insufficient, except in rare instances, to cause symptoms of obstruction. This is clearly evident from the clinical history of the great majority of cases. But there are certain conditions, which will cause spasm after birth sufficient to complete the obstruction in an already stenosed orifice. This combination determines the onset and severity of the symptoms. Some of these patients recover without surgical interference.

Cramer, W. OBSERVATIONS ON THE FUNCTIONAL ACTIVITY OF THE SUPRARENAL GLAND IN HEALTH AND IN DISEASE. [Sixth Scientific Report Imp. Cancer Research Fund, 1919. Medical Supplement.]

The observations are based on the conception, formulated by the author in previous papers, that the thyroid and adrenal glands form a humoral apparatus for the heat regulation of the body. This concep-

tion is summarized in the introduction as follows: The thyroid hormone stimulates the secretion of adrenalin from the adrenal. This produces on the one hand a discharge of glycogen from the liver which leads to a general rise in metabolism and thus to an increased heat production. On the other hand, an increased secretion of adrenalin, if sufficiently strong, will contract the arterioles and thus diminish the heat loss. The present paper deals with the application of this conception to a number of pathological conditions, associated with disturbance of the heat regulation of the body, namely: bacterial infections associated with a pyrexia on the one hand and with a sub-normal temperature on the other, experimental fever produced by the injection of tetrahydronaphylamine, and exposure to cold. Other conditions which have been investigated are shock, hemorrhage, anesthesia, experimental hyperthyroidism produced by feeding with thyroid gland, and acidosis. The functional activity of the suprarenal gland was studied by means of a new histochemical reaction which depends on the fixation of the gland in osmic vapour. By this method the fine adrenalin granules in the medullary cells are stained a deep black, and it is possible to follow their passage from these cells into the central vein when the gland is stimulated to activity. At the same time the histological details of the gland are preserved. The appearances of the gland at rest and in different stages of functional activity are described in detail and illustrated by drawings. A peculiar and important feature of the activity of the gland is the flexibility with which the gland responds to a stimulus not only by the secretion of adrenalin but also by a corresponding new formation. This 'self-regulation' leads to the result that with a slight or even moderate stimulus the gland remains always loaded, although it may be secreting continuously. This occurs, for instance, in certain bacterial infections, such as a streptococcal abscess, and in exposure to cold of a moderate degree of severity. If the stimulus is strong and prolonged, as for instance in severe exposure to cold, the new formation of adrenalin may not keep pace with the rate at which it is poured into the blood stream. Then there is a partial or even extensive depletion of the gland from which it recovers when the stimulus is withdrawn. An inhibition of the new formation of adrenalin is postulated for a number of different conditions in which a depletion of the gland occurs without an antecedent hyperactivity. This occurs in the terminal stages of such bacterial infections as gas gangrene or a virulent streptococcal septicaemia. Anesthesia, acidosis, and hemorrhage have a similar but less pronounced effect.

The suprarenal gland is therefore an organ the functional capacity of which may be called into action by a great variety of different conditions, of which the one connected with the heat regulation of the body is almost always operative. A number of very different conditions when present together may thus reinforce each other in their effect on

the organism by their joint action on the suprarenal gland. To any one of these when acting alone the gland may be able to respond with an increased activity, so that even with a gland temporarily depleted the animal may resist the condition without manifesting serious symptoms. But a combination of several such conditions operating together may overtax the functional capacity of the gland and produce a complete exhaustion of the same. Then collapse ensues with symptoms resembling shock, and the animal dies. Such a combination of conditions was particularly likely to occur in wounded men, more especially when gas gangrene supervened. This condition of collapse, which is often described as shock, is different from that of true post-operative shock as studied in animals, in which it developed in the course of an abdominal operation, as the result of excessive handling of the intestine. In true post-operative shock the suprarenal gland is loaded with adrenalin and actively secreting it at the very moment when the animal dies with a low blood pressure and a sub-normal temperature. Post-operative shock is therefore a condition *sui generis*.

Observations were made on pathological changes in human suprarenal glands in different conditions, for which only formalin fixed material was available. A congestion of the gland affecting especially the medulla and the zona reticularis is looked upon as the most significant indication of an actively secreting gland. Examples are given which show that in conditions characterized by a severe pyrexia, such as influenza and malaria, there is frequently an intense congestion of the gland which may amount to hemorrhages into the gland. An increased functional activity of the suprarenal gland is accompanied by morphological changes in the thyroid gland which are briefly described and figured.

It is indicated how these conceptions bear upon the rational treatment of the various conditions. The importance of the application of warmth in the treatment of wounded men is particularly emphasized. It is pointed out that the conditions of modern war put a more severe strain on the suprarenal gland than any other organ, and that the strain of which this gland can be most easily relieved is that concerned with the heat regulation of the body.

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Marui, K. MORPHOLOGY. THE MAUTHNER CELL SYNAPSE. [Jl. Comp. Neurol., Vol. 30, No. 1. Med. Jl. Aust.]

The problem of the synapse and the transmission of a stimulus from one nerve cell to another has attracted the attention of many investigators for more than a century, and even now is one upon which enlightenment is still lacking. Kiyoyasu Marui in the Journal of Com-

parative Neurology (Vol. 30, No. 1, December 15, 1918) presents his findings concerning the finer structure of the synapse of the Mauthner cell, with especial consideration of the Golgi net of Bethe, the nervous terminal feet and the nervous pericellular terminal net of Held. As material for his investigations he used serial sections of brains of the adult fishes *Ameiurus nebulosus* and *Carassius auratus*. In all ninety-seven series of normal fish brains were studied after preparation by nine different methods. In the axone cap and on the surface of the Mauthner cell a Golgi net was very distinctly demonstrated, particularly in those prepared by Levaditi's method. This net is of a glious nature and is in close relation to the nervous elements of the synapse. The unmyelinated parts of the nerve fibers are also enveloped in a sheath of glious tissue of which the finer structure is as yet unknown. The hypothesis of Held concerning the existence of two kinds of net on the cell surface is denied. There exists only one net structure, which is formed by both nervous and glious tissue. The contact theory is to be regarded as a histological impossibility as the terminal feet are not specific contact organs, but the points in the course of the axone fibers where the dissolution of fibers takes place. The continuity of the intra- and extra-cellular neurofibrils is very clear. The intra-cellular neurofibrils do not form any reticulum in the Mauthner cell, nor was any net structure seen in connection with the nervous terminal feet.

There have been abundant researches on the neurocytological manifestations of the nerve cell in fatigue, but Marui believes his present researches to be the first undertaken to investigate the histological alteration of the synapse in fatigue (Jour. Comparative Neurology, Vol. 30, No. 3, April 15, 1919). This is probably due to the fact that the structure of the synapse has not yet been conclusively demonstrated in the normal condition but from work previously published, the author believes his results have been sufficiently definite on this point to permit his attempting experimental work on the pathological condition, more particularly as regards fatigue. The material used were small fishes, a resting non-fatigued control being provided in each experiment. The fish experimented on was fatigued (or forced to activity) by being placed in a stream of running water, against which it was compelled to swim in order to maintain its equilibrium. The duration of the experiment varied from twenty-four to ninety-eight hours and upon complete exhaustion the fish was decapitated, the brain quickly dissected out and fixed. In all 122 series of normal and fatigued brains prepared in nine different ways were examined. Careful investigation of the cell body, as well as the synapse of the fatigued Mauthner cell, revealed a number of interesting findings. The cell body was found either swollen or shrunken, as was the nucleus and nucleolus, which often assumed an angular or otherwise irregular shape. The turgescence was regarded as the result of over activity and the shrinkage as that of

exhaustion. The Nissl substance was in an advanced stage of chromatolysis. In the nervous structure of the synapse no definite alteration could be determined, but the synapse showed a number of ameboid glial cells with basophile granules. Fat drops were demonstrated in the glia cells and in the cells of the blood vessels. In many cases the reticular glial structure of the synapse appeared to deviate markedly from its normal configuration and was in parts broken up. This was interpreted as being due to the detachment of the ameboid glia cells from the reticulum and in part also to the loosening and dissolution of the net beams. The appearance of the ameboid glia cells showed that some catabolic process occurs in the synapse as an effect of pathological nutritional conditions in fatigue.

Adrian, E. D. THE RESPONSE OF HUMAN SENSORY NERVES TO CURRENTS OF SHORT DURATION. [Journal of Physiology, Vol. LIII, p. 70, 1919.]

This paper deals with an attempt to distinguish the different varieties of sensory nerves in man by determining the characteristics of the electric current required to excite them. This method was introduced by Keith Lucas and applied by him to the analysis of the different excitable mechanisms in muscle and nerve. It consists in stimulating with constant currents of variable duration and relating the duration of current flow to the least strength necessary to excite. The strength-duration curve so constructed shows a time factor (called by Lapicque the *chronaxie*) which is constant for any given tissue and varies widely from one tissue to another. If the sensory nerves subserving protopathic and epicritic sensations belonged to two distinct systems they might be expected to show a difference in *chronaxie*, and this would be all the more likely if the epicritic fibers were medullated and the protopathic non-medullated (cf. Ranson, Brain, Vol. XXXVIII, p. 381, 1915). An electric stimulus causing a sensation akin to touch should take effect on the epicritic fibers and one causing a painful sensation should stimulate the protopathic and at first sight there is some evidence in favor of a longer *chronaxie* for currents giving rise to pain than for those giving sensations of touch. However, this difference appears to depend on many other factors besides the nature of the nerve fibers and if these factors are eliminated the *chronaxie* for painful stimulation is approximately the same as that for non-painful stimulation and the same as that for stimulation of human motor nerve. The author concludes that the nerve fibers conveying protopathic and epicritic sensations cannot differ widely in structure. This does not prove or disprove the theory of Head and Rivers, but it is unlikely that the protopathic sensations are conveyed by non-medullated fibers. [Author's abstract.]

Cobb, Stanley. CUTANEOUS SENSIBILITY IN CASES OF PERIPHERAL NERVE INJURY: EPICRITIC AND PROTOPATHIC HYPOTHESIS OF HEAD UNTENABLE. [Amer. Arch. Neur. Psych., Nov., 1919.]

Lack of standardization in the methods of examining sensibility in cases of peripheral nerve injury has led to diversity of results, and thereby to differences of opinion regarding the physiology of the peripheral nerves. Another source of confusion lies in the terminology used to describe areas of anesthesia. A large part of this report is therefore devoted to reviewing the literature, in an attempt to gather from recent physiologic investigations facts applicable to the clinic. Too many workers have been willing to accept textbook interpretations of Head's work without reading the original papers themselves. Thus the popular conception of Head's theory has become more simplified, more attractive and farther from the facts, while the work of Boring, Trotter and Davies has received little attention.

In his criticisms of Head's hypothesis, Boring states that it stands in peculiar isolation with regard to the work of other investigators, that the evolutionary grounds for it are unique and invalid, and that the results of his own experiment do not bear it out. It cannot be derived even from Head's papers that for each sense there are the two types of innervation, although his argument and discussion strongly suggest this conclusion.

In the clinic at U. S. Army General Hospital No. 11 approximately 540 cases of nerve injury were examined in the six months ending April, 1919. At first areas of dissociation were searched for and found, but further investigation with algesiometers and esthesiometers showed that "*dissociations of sensation in peripheral nerve lesions arise from comparing stimuli not only qualitatively different but quantitatively unequivalent.*" In short, they are fractions because of lack of proper standardization of the methods of examination. In several cases pain was brought out by a light needle prick well within the general area of analgesia. Careful testing showed that these painful spots were usually along the course of a superficial vein. Subcutaneous pressure was tested with a spring instrument similar to the algesiometer, but with a blunt end about the size of a common pencil, and with a sliding scale on the side measuring pressures from 200 to 2,000 grams. Thus muscle and bone sensation can be tested in areas where the skin is anesthetic. The thresholds were recorded and charted in terms of grams pressure. In general, the deep anesthesia seems to correspond to the muscles paralyzed. Conclusions are as follows:

1. A review of the experimental and clinical work on cutaneous sensibility indicates that the epicritic and protopathic hypothesis of Head and his collaborators should be abandoned.

2. Dissociations of sensation due to peripheral nerve lesions arise from comparing stimuli not only qualitatively different but quantitatively unequivalent. In short, they are artefacts.

3. Clinical examinations should be simple, and since areas of dissociated sensation in peripheral nerve lesions are shown to be due to artefact, examination for one mode of sensation suffices for diagnosis.

4. For clinical sensory examinations quantitatively standardized stimuli should be used.

5. Subcutaneous pressure is best tested with an instrument which gives the threshold values in grams.

6. Hyperalgesia may follow the course of superficial veins.
[Author's abstract.]

Pollock, L. J., and Cluney, W. T. VITAL STAINS AND THE CENTRAL NERVOUS SYSTEM. [Am. Jl. Med. Sc., 1918.]

The writers call attention to the necessity of investigation in regard to the conveyance of substances to the central nervous system in order to discover the reason for the apparent inability of the arsenical preparations used intravenously for quaternary syphilis to reach the tissues. Experiments in *intra vitam* staining of the central nervous system have produced a variety of conclusions, which have not been satisfactorily borne out. Therefore these investigators sought further data in regard to the relative diffusion characteristics of dyes, their solubility and their vital staining properties. The different stains used varied in their manifestation of reaction, but from these experiments and those in the literature cited the writers offer certain comments. Vital stains may possess the characteristic of both crystalloids and colloids. As a rule those having colloidal properties exercised a selective action leaving certain tissues unstained. It is probably the colloid character of dye which is partly responsible for failure in penetrating blood vessels. Also the lipoid character of a cell membrane may play some part in its impermeability. There is also a refusal of the content of the cell to take up the stain. In using trypan blue and fluorescein the writers found that solutions, of a concentration not exceeding that employed in the use of salvarsan, injected subdurally did not stain the brain or spinal cord. In cases injected subdurally with a stronger solution a slight blue color may result, but microscopic examination has not revealed the presence of a true vital stain. The meninges, however, are stained. The writers conclude that "when dealing with colloidal stains or drugs the meninges are more accessible by subdural than by intravenous routes." This cannot be stated of the central nervous system. When intravenously introduced, certain dyes and salvarsan fail to reach the central nervous system largely because of the physiochemical reactions between the substance and the tissues. The permeability of the blood vessels plays but a small rôle and the cerebrospinal fluid and choroid plexus none at all.

Finally, salvarsan, which probably like trypan blue leaks from blood vessels relatively slowly, when intravenously introduced possesses as great

a spirochetocidal action upon those organisms situated in the pia, adventitia and perivascular lesions in the brain as elsewhere, providing the spirochetes have not developed a peculiar resistance to such a drug.

Stookey, B. SURVEY OF NERVES. [Surg. Gyn. and Obstet., Vol. 29. No. 3. J. A. M. A.]

In Stookey's opinion the repair of nerve defects by means of nerve flaps has not been definitely supported clinically, as evidenced by a critical study of the reported cases. Experimentally, it has been shown that nerve flaps do not serve as conducting paths for the down growing neuraxes. Nerve flaps whether central or peripheral are merely degenerated partial nerve segments. Continuity and union of neuraxes does not take place at the point of suture. By the formation of nerve flaps from the central stump a portion of the nerve from which neuraxes must grow is removed. Distal as well as central flaps may sever muscular branches. By reversing the flaps they are taken out of their field. Thus the down-growing neuraxes are prevented from reaching the muscles through these muscular branches even were regeneration to take place. For these reasons the nerve flap method to bridge nerve defects should be discarded in peripheral nerve surgery.

III. PSYCHONEUROSES AND PSYCHOSES

1. PSYCHONEUROSES

Moreau, L. INTENSIVE GALVANOETHERAPY IN HYSTERICAL PARALYSIS OF THE EXTREMITIES. [Bulletins et mémoires de la Société médicale des hôpitaux de Paris, January 23, 1919.]

This author asserts that for prompt results in hysterical paralysis intensive galvanic treatment—*torpillage* or torpedo treatment—cannot be excelled. By this method an effort of the will, or defensive automatism, is immediately brought into play. The author generally used the monopolar method, with the indifferent electrode placed over the patient's back, thus obviating distraction of the patient's attention by a change in the electrodes after completion of the electrodiagnostic examination. The currents used did not exceed forty-five to fifty milliamperes, at eighty volts. Three illustrative cases of immediate cure by the method are presented—the first, one of monoplegia of the left upper extremity following injury to the chest; the second, a right sided radial paralysis following superficial burns of the hand, and the third, a spontaneous hysterical contracture of the right lower extremity. In the first case, a forty-five milliampere current was used. The patient having seen his paralyzed arm fly upward as a result of powerful contraction of the deltoid, the active electrode was quickly taken off and the patient commanded to move his arm. He immediately did so, to his great astonishment, and the motor functions were permanently restored. [This third degree method has been in use for centuries in other barbaric forms—

hot pokers, ducking in water, whipping, etc. It dislodges the symptom. It never cured any patient yet. J.]

Turner, W. A. NEUROSES AND PSYCHOSES OF WAR. [Lancet, Nov. 9, 1918.]

Turner refers to the view of contemporary psycho-pathologists that all neuroses are "reactive" disorders, or consequences of a failure of psychologic adaptation or readjustment of environment. This is true particularly of the young soldier who is unable to adjust his outlook to service conditions; a large number of these men are constitutional neurasthenics, and any abnormal latent trend are quickly brought to the surface under the stress of camp life and military discipline. The most common type of mental psychosis observed in soldiers is a confusion of psychosis, which may be superimposed upon a foundation of feeble-mindedness, or a basic reaction attributable to cerebral commotion, shell shock, or psychical trauma occurring in soldiers with a psychopathic inheritance. In both types prognosis is good, the condition lasting from a few days to several weeks. On the other hand, a confusional psychosis may be the early phase of an underlying and more deeply rooted disorder, such as dementia præcox. The author, however, gives his attention chiefly to the different types of war neuroses, among which are the young and inexperienced soldiers who have given way to fear at their first experience of bombardment; those suffering from fatigue and nervous exhaustion, who require rest to restore them to duty; the cases of anxiety neuroses which occur generally in young officers, who in spite of insomnia, loss of self confidence, headache, mental depression, fear that they may be incapable of the adequate performance of their duty, that they may be considered cowards, etc., manage to carry on until some commotional shock—such as horrible sights, partial burial through shell or mine explosion, bad news from home, or a cerebral concussion or commotion from shell shock—may precipitate a breakdown and they become incapacitated. The effect of these traumata, and particularly the last, is the onset of stupor, delirium, or amnesia "fugue." Stupor may be profound with rigidity of the limbs of the catatonic type, or in milder cases the patient may appear dazed and confused, may be easily startled and more or less indifferent to his surroundings. The stupor may be followed by mutism, deaf mutism, aphonia and stuttering; mutism has been explained as a state of functional inhibition, due to fear or horror which underlies the stupor. Astasia abasia is another symptom which may follow stupor and which is often accompanied by anxiety, the patient being obsessed by a fear that he is unable to walk. These disabilities, if left untreated, soon become "habits," develop into "war hysterias" and eventually "defence mechanism" which though developed unconsciously, persist for many years.

Juarros, C. THE ENVIRONMENT IN NEUROSES IN CHILDREN. [Archivos Españoles de Pediatría, December, 1918. J. A. M. A.]

Juarros protests against the usual disregard of the conditions in the environment when a child presents a nervous tendency. A change to another environment will often cure a severe neurosis, or the removal of some one person from contact with the child will sometimes prove the key to the problem. In one of two cases reported a girl of 8 had been having three or four convulsions a week for a year, evidently of hysteric origin. Doctor after doctor was consulted and all diagnosed hysteria and ordered sedatives and general hygiene. When the child was brought to Juarros, he investigated conditions in the home and thus found that a cousin who lived in the family was subject to hysteria and convulsions. As this woman was a fixture in the family, the child had to be sent away from this mental contagion. She was placed with other relatives, and after the first month had no more convulsions during the following five months to date. In the other case the girl of 7 was unusually bright in school and her parents were "showing her off" constantly to friends, and taking her to shows, etc., so she did not get to bed till 12 or 1 and she had no rest during the day. Restless, agitated, light broken sleep, talking in her sleep, her condition resembled that of maniacal excitement in adults. The general health suffered, the appetite was lost, and she was growing thin when Juarros was consulted. He convinced the parents of the evils of their management of the child, and when this was corrected all disturbances speedily subsided. Every one admits theoretically that the seed for neuroses in adults is generally sown in childhood, but in the specific case this is too often forgotten.

Lhermitte, J. CAMPTOCORMIA. [Prog. Méd., 34, May 24, 1919, J. A. M. A.]

This peculiar attitude, called by Meige by this name, consists in the fact that the subject does not straighten up. The author's analysis of the neurosis shows that the main factors are a conscious phobia of everything connected with the fighting, and an unconscious longing for protection. The whole is thus a phenomenon of autoprotection. The camptocormia corrects itself as the man lies flat on his back, and a plaster corset is then applied for two or three weeks, a période de desincubation forcée. This method is effectual, but it takes so much time that it has been superseded by what Odier calls suggestion électro-psychique impérative, which he describes in minute detail and emphasizes the brilliant successes realized with it in the neuropathic syndromes engendered by the war. The most brilliant successes have been realized with functional paraplegia, but sometimes a sitting of several hours is necessary for this. Camptocormia of three years' standing has often been cured by this means in fifteen minutes. He says that it has been styled "brutal," and the men call it "being torpedoed," but the author says the

blind forces of the subconscious must be fought, and strong measures may be needed.

Hamilton, Margaret J. PSYCHOLOGICAL ANALYSIS, WITH CASE STUDIES. *Journal of Abnormal Psychology*, February, 1919. Pp. 30. Reprints, 50 cents, of author, 4057 S. Figueroa St., Los Angeles, Cal.

"Emotional repression, conflict, waste, and starvation are the primary causal conditions of a very much wider range of specific pathological disabilities, both physical and mental, than has hitherto been recognized. By the methods of psychological analysis and reëducation these emotional conditions can be discovered and effectively dealt with. Furthermore, the presence of specific emotional biases and inhibitions is a very large factor in the production of intellectual mediocrity and failure, in the misdirection of well-trained logical processes into destructive and self-contradictory programs of conduct, and in the failure of moral ideals to function in controlling the adjustment process. Emotional conditions, whether conscious or unconscious, may serve to inhibit the proper growth and effective use of intelligence, or may deflect its activities into undesirable channels. The discovery and removal of these emotional inhibitions and biases is thus essential to the best success of educational procedure on both its intellectual and moral sides. Indeed, on the side of the reëducative procedure, the moral reconstruction of the individual is often the chief task of the analyst. It should be noted that the term moral is here used in its widest and deepest sense, meaning thereby that healthful unity of the competing instincts and impulses, that adjustment of the individual to his social environment, that harmony of his interests with one another, that robust and straightforward honest dealing with the facts of both the internal and external life, which make possible the resolution of the harmful conflicts and repressions, and free the mind for its most healthful and efficient functioning intellectually.

"The term *psychological analysis* must be discriminated from *psychoanalysis*, since *psychological analysis* makes no use of the Freudian technique, nor of the specifically Freudian concepts. Furthermore, while *psychological analysis* lends itself to the discovery of the mental factors involved in the production of pathological symptoms of both mind and body, the term covers a much wider range of operations. By psychological analysis we uncover the motivation, ideational and emotional, which is present to produce reactions that have no pathological symptoms accompanying them or resulting from them, but which may be interfering with the most successful adjustment of the individual in his reactions to his particular environment, and which are therefore causing him to fail to meet his individual problems on the plane of efficiency which should be normal to his native capacity. Hence '*Psychological Analysis*' is an analysis of conduct with a view to discovering the mental elements involved in producing that conduct. In such an analysis,

not only must the ideational and emotional life most directly concerned be brought to light, but there must be uncovered the deeper-lying, often unconsciously functioning, attitudes and trends, the more distant currents of feelings and the systems of ideas which are the backlying causes of those forms of thought and feeling that are more overtly in consciousness, or nearest in time of the conduct that is being analyzed.

"The person who is being dealt with is shown, as rapidly as he is willing and able to face his own mental life, the ideas, feelings, and general attitudes of mind that are interfering with his ongoing, and a program of thought and action to correct these is mapped out for him to follow in his daily program of adjustment. This program of thought, feeling, and action, is based upon the results of the analysis of the individual case, and upon the results of the knowledge, gained through analysis, of the mental factors that have been found to be most successful in bringing to pass that unity of mind, and that healthful reaction to environment, that is necessary to the best ongoing of the individual. In this work the individual may be said to build a new character through the conscious knowledge of the factors which were his former undoing and the conscious endeavor from day to day to change his ways of thinking and feeling through sincere and earnest efforts to follow the program that is outlined for him. In this he is successful in so far as the inhibitions that stood in the way of acquiring these new mental habits are removed, and in so far as he puts no resistance to the acceptance and practicing of the new program.

"The process by which the maladjustments are corrected is thus, in a very deep and significant sense, an *educative* process. People come to the analyst to be *taught*—to learn why they are as they are, why they have reacted to life as they have, what it is in them that has brought them to their failure or to their pathological condition, and how they may so reconstruct their mental lives as the very sources of motivation that they may come to react differently so as to correct the causes and escape from their maladjustments. Hence it is proper to speak of the individual who comes for help through psychological analysis as a *student*, since this is the attitude which he must and does take if he is to receive any lasting benefit.

"In making the analysis there must always be concrete contact with the student's daily life, his adjustments where he is meeting his strains and stresses and tensions and suffering his defeats. Upon the basis of the findings here, a program of thought, feeling and action is mapped out which will relieve the repressions, put the individual into conscious control of his mental life, and which will build into his mind new ways of thinking and feeling in place of those which caused his difficulties and maladjustments.

"Too much emphasis cannot be laid upon the fact that success in psychological analysis and reëducation demands the most sincere, in-

telligent, and sympathetic understanding of human nature. The establishment in the mind of the student of an attitude of genuine confidence in his analyst is absolutely essential if the conscious and unconscious life is to come forth from its hiding, as it were, and offer itself, at first timidly, for examination. This confidence grows and becomes strong enough to make it possible for the student to face with his analyst the inmost recesses of his mental life only as the analyst, by answering to the needs of the student mind proves to be worthy of his confidence. For a complex to be discharged, it is not sufficient that it be uncovered and all its elements revealed to the consciousness of the student. Discharge of a complex requires that every element that goes to make it up, and all the causes that were at work to produce and continue it, shall be met at once upon their appearance with intelligent understanding by the analyst. It is not enough to listen with sympathetic ear. To meet the student mind with intelligent understanding as it unfolds itself, requires such understanding both of the causes of the complex and of the specific nature of that student that every element of the complex can be met by the analyst with a constructive program of thought and action. This program must be one that the student is able and willing to accept and that will enable him to understand the causes of his difficulties more clearly and to meet them. The complex is discharged only to the extent that the student is able and willing to accept and follow the program, for only in the acceptance of, and action in accordance with, the new program, come those changes of mind that both relieve the complex of its burden of emotional pressure and tension, and at the same time enable the student to make his adjustments in thought, feeling, and action in such a way that the emotional tensions are not renewed."

The three case studies which follow are illustrative of the methods and principles of psychological analysis and reëducation. Cases One and Two are of epileptoids, young women under thirty. The epileptic seizures are shown by analysis to come out of great repression and rebellion against any sort of control and direction. Being thwarted and interfered with in having their own way is at the bottom of their difficulties. The spasms ceased and control was regained by reëducational processes whereby the students were enabled to take different attitudes toward themselves and toward others, and to meet, thus, the give-and-take of life in a normal, flexible manner, meeting the opposition of others without rebellion, and finding means of self-expression, and developing an ability to take direction, without renewing the inner conflict.

Case Three is of a woman in the middle fifties, suffering from advanced amnesia. Analysis showed this to be the result of repression and starvation of a rich emotional life. This repression and lack of satisfaction grew out of her failure to make her adjustments, particularly in her family life, and thus to secure, in her home, the satisfactions she craved. Her memory has been completely restored to normal function-

ing upon the discharge of the complexes through furnishing her a program of thought, feeling, and action, whereby she has been enabled to make her adjustments and to find channels of outlet and return for her emotional life.

2. PSYCHOSES.

Delgado, H. F. NATIONAL MENTAL HEALTH. [Revista d. Psiquiatría, 1, April, 1919.]

Delgado says there is only one mental hospital in Peru and the care of the psychotic is grossly inadequate, only from 5 to 10 per cent. of those with mental disorder being accommodated. The paper details a series of lectures, conferences and clinics for school teachers and others to further the knowledge of medical psychological needs to try to meet the serious situations constantly present.

Claude, H. NERVOUS AND MENTAL DISTURBANCES FOLLOWING INFLUENZA. [Bulletin de l'Académie de médecine, April 22, 1919.]

Supervising the treatment of influenza cases at the Saint-Antoine Hospital, Paris, for the most part young or middle aged women, this author observed, during the febrile period, headache, neuralgias, asthenic symptoms, and delirium not unlike those witnessed in acute infections in general. During convalescence, however, the facial, cervical, and sciatic neuralgias encountered were often very persistent, resisting treatment for several weeks. In a few subjects the asthenia became so marked as to suggest bulbospinal myasthenia. The tendon reflexes were greatly attenuated. In one patient, a man of fifty years, there developed acute myelitis. One month after the onset he had incontinence of urine, flaccid paralysis with loss of reflexes, and slight sensory disturbances. Bedsores rapidly formed on the sacrum and heels, and the patient died after six weeks. Wassermann was negative. Post-mortem study showed acute hemorrhagic myelitis in the gray substance of the mid-dorsal and lumbar regions, without any meningeal or vascular changes suggestive of syphilis. Mental disturbances were much more frequent, being met with in seven patients, and always developing in eight to fifteen days after defervescence, when the subjects were up and apparently well. Two cases terminated fatally, and presented practically identical features, viz., melancholic tendencies, fear of death, fear of being poisoned, later violent delirium with verbigeration, shouting, refusal of food, and finally depression and mutism with short periods of excitement, erotic in one case and anxious in the other. The autopsy, conducted in one case, showed marked hyperemia of the cortex and disseminated areas of edema. In another case, occurring in a woman of thirty-two years, mysticoerotic delirium appeared suddenly ten days after convalescence and had not yet passed off after three months' residence

in an asylum. In a fourth patient there developed typical maniacal excitement with delusions of persecution, which largely disappeared in one month. The fifth case showed mental depression, sadness, mutism, and negativism, and the sixth, aboulia, indifference, and slight mental confusion, which passed off only after three months. The seventh case, in a boy of thirteen, exhibited anxiety, hallucinations, and manifestations of abject terror, which disappeared gradually in the course of three weeks.

Schlesinger, H. DELIRIUM WITH INFLUENZA. [Rev. méd. d. l. Suisse Romande, April, 1919.]

This paper calls attention to the association of delirious states with the febrile phase of influenza, but the delirium is not merely a function of the fever, for it has appeared both before and after the latter, is not variable in proportion to the intensity of the fever and does not run concurrently with the latter. It may be ordinary subacute or typhoid delirium. Insight cuts no figure in prognosis, for in subjects with perfectly lucid periods death may not be far off, and the converse is true. It is admitted that a rise of temperature in the midst of a delirious case may aggravate the delirium or cause a lucid mind to become clouded but, as abundantly stated, there is no necessary connection between the two. In subacute delirium the patient may be seized suddenly with motor activity and may perhaps even leave his bed and cell, running against hard objects, becoming covered with blood and feces, and in some cases heading directly for an open window. Strange to relate, these men may retain considerable insight as to their condition with good orientation and state that they are merely swayed by an irresistible power. The behavior is like a fugue on a small scale. It is evident that many of these sufferers are badly frightened, they know not at what. Such cases have been seen in other infections and the author classifies them as infectious deliriums. During convalescence we are apt to see now and then a catatonic state associated with post grippal asthenia. Some of these exhibit peculiar automatisms, as singing or whistling one tune indefinitely. It is impossible to tell in some of these cases whether or not precocious dementia is setting in. It has been necessary to interne some of the patients. A few cases of delirium tremens developed in grippe patients. [Med. Rec.]

McDowall, C. F. F. GENESIS OF DELUSIONS. [Br. Med. Jl., June 21, 1919.]

Social and political tendencies, the author said, were the outcome of an analysis, more or less critical, and believed by the individual to be impartial. A comparatively insignificant incident might attract attention and be the beginning of a prolonged mental conflict. The reasoning was not always logical nor the argument conclusive to people of other opin-

ions, but the conclusion arrived at was final. Probably the presence of a hereditary taint was the most important factor in the preparedness of anyone to become mentally disturbed or actually insane. Delusions and hallucinations did not arise accidentally; they had a definite basis in the personal experience of the sufferer. It was the duty of the medical man to analyse the processes by which the abnormality had arisen, and to work back to what might be termed the "taking-off point." In men the underlying cause was often very quickly reached, but women were more reticent. The means at the disposal of the alienist was mental analysis—that is, an examination which would not only investigate the conscious problems of the patient but also bring to light the factors of subconscious origin. The functional condition was much more easily treated than the state in which the delusions or the hallucinations had begun to assert themselves. The mere elucidation of the cause was not enough to effect a cure; the patient should be taught to follow, in their logical sequence, all the ideas he had misinterpreted and misunderstood. Hallucinations did not occur in states of depression at an early stage of the malady; delusions developed earlier. He related cases showing a striking improvement and good nights immediately following the unburdening of the primal incident in the mental condition.

Lurie, Louis A. PERNICIOUS ANEMIA WITH MENTAL SYMPTOMS. [*American Archives of Neurology and Psychiatry*, 1, 1919.]

This article can be conveniently divided into two parts. In the first part the author gives a brief resume of the various theories that have been advanced to explain the relationship between the anemia and the lesions found in the brain and spinal cord. After pointing out wherein the different theories fail to account for all the clinical and pathological findings, the author himself, proposes a theory, which is really a modification or combination of two of the older theories, and which apparently correlates all the various manifestations of pernicious anemia as related to the blood and central nervous system. The point made by the author is that the neurons are exposed to two lines of attack, namely: first, a direct attack by the toxin itself and secondly, an indirect attack by the anemia. In substance the author believes that the anemia, if persistent, so interferes with the metabolism of the nerve cells that they succumb to the action of the toxin thus producing the well-known lesions of the central nervous system.

Briefly stated this theory reads as follows:

1. One toxin causes both the blood and the central nervous system changes.
2. The toxin acts independently on the blood and on the central nervous system. This would account for those cases in which (*a*) the neurological symptoms manifest themselves before the anemia or (*b*) in which the anemia precedes the brain and cord changes or (*c*) in which both conditions arise simultaneously.

3. As soon as the typical blood picture of pernicious anemia develops and persists for a considerable length of time, the metabolism of the nerve cells is so impaired that the changes which were purely functional at first and due to the irritating action of the toxin alone now become organic and permanent.

In the second part of the paper the author gives in detail the case histories and microscopic findings of four cases of pernicious anemia that had definite mental symptoms. All the cases showed various forms of neurological disturbances altho no abnormal reflexes were present in any of them. Of the mental symptoms, the most characteristic and common were delusions of persecution and paranoid ideas. Those patients in whom the mental symptoms had existed for a long time showed, histologically, marked evidence of cortical involvement. In the case of the epileptic boy in which the disease ran a very rapid and fatal course, the spinal cord lesions were more marked than those in the brain.

The lesions in the brain were similar to those in the spinal cord. The pyramidal cells showed uniform degeneration of varying intensity. The blood vessels were intimately related to the areas of degeneration. Their walls were thickened and the perivascular spaces distended. A point to which the author calls attention is the uniform presence of the foci of Preobrajensky in sections of the pons of every case. The significance of this is open for speculation. Another interesting fact is the presence of diffuse yellow pigmentation in the anterior horn cells of the spinal cord which is quite distinct from the pigmentation usually seen in the cells of the aged. Neuroglia changes were present in the brain and cord in the chronic cases and not in the acute case. These changes were in the form of an overgrowth of both the cellular and fibrillar elements.

Among the most important conclusions drawn by the author are the following:

1. There appears to be a fairly definite and constant relationship between the clinical symptoms and the pathological changes.

2. The psychoses can be classified with the symptomatic psychoses of a toxic-organic nature.

3. The foci of degeneration bear a definite and distinct relationship to the blood vessels.

4. In every case the miliary foci of Preobrajensky were found in the pons.

5. In speaking of the neuropathology of pernicious anemia it is not sufficient merely to describe the lesions found in the spinal cord. The brain changes are too numerous and definite to be enumerated. The neuropathology of pernicious anemia should include this entire central nervous system. [Author's Abstract.]

Bailey, P. RECONSTRUCTIONS IN NERVOUS AND MENTAL DISEASE. [Congress Am. Physician, June 16, 1919, Med. Rec.]

Bailey said that the ideal of reconstruction in nervous and mental diseases which seemed to him to shine out above all others at this time was that which, vivified by the lessons of the war, had for its object the improvement of the nervous stability of the whole nation. It should not be confined to those who lately wore or were still wearing the uniform, but should include all others, the less fortunate and their children. It should be a civil rather than a military reconstruction. There were practical reasons for this. As far as the treatment and rehabilitation of the soldiers themselves was concerned, the methods employed in the Army, with a single exception, were the same as should be a part of a general civil program, and actually were matters of therapeutic routine in the most progressive communities. It was by no means meant to belittle the importance of the service rendered nervously ill men by neuropsychiatric officers in this country or in France, but, in this country at least, the constructive service of these officers was less therapeutic than preventive, as it consisted in the exclusion from the troops of candidates for service who, if accepted, would weaken the organization upon which the country's existence depended. It was a matter of no little concern that 72,000 young men, inapt from nervous causes, were discovered and abandoned, but the real concern was that they were here, the war did not make them, and they were in no sense products of the mobilization. Their enforced abandonment had disclosed how little provision we had made for the study of the conditions which were responsible for them, or for the treatment and control of either individuals or conditions. The neuropsychiatric examinations had given a conclusive and final demonstration that mental and nervous disease ranked among the chief of our public health problems. They had unearthed a vast field in preventive medicine which, up until now, was almost untouched. The total of 67,417 which was the number of fully classified neuropsychiatric rejections from the Army up to February 1, 1919, put nervous and mental diseases fourth on the list of rejections by clinical groups, its group being succeeded by those of: (a) eye, ear, nose and throat; (b) bones and joints; (c) heart and blood vessels. The nervous and mental group had a sanitary and economic importance not indicated by its relative standing. The other defects mentioned by no means implied an inferiority which would prevent the individual from competing on equal terms in many civil occupations. Rejection for nervous and mental defect implied not only an almost universal vocational inequality, but also, and this especially in the most numerous class, the feeble-minded, that the individuals checked civilization and were certain rapidly to increase their own kind. All the patients passing through the control of the neuropsychiatric officers were unwounded and might be included in seven groups as follows: psychoses, 11 per cent.; neuroses, 15 per cent.;

epilepsy, 9 per cent.; organic nervous diseases or injuries, 18 per cent.; inebriety (alcohol and drugs), 6 per cent.; mental defect, 32 per cent.; constitutional psychopathic state, 9 per cent. It must be emphasized that the potentially insane became insane in the army more frequently than they did, at least to require custodial care, if left in civil life. No new types of mental disease were differentiated, but additional proof was forthcoming that the outlook in military psychoses was brighter than in those which developed in civil life. The experience demonstrated the importance and value of the modern methods of care which were established throughout the military hospitals. It was shown that physical restraint was rarely necessary and imperilled recovery. In respect to the insane as a nation-wide problem, the war had shown the economic as well as the humanitarian importance of proper care. Few of our State Hospitals now had the personnel required to furnish such care, a want that we should hasten to supply. The system of state hospital mental clinics should be widely extended. Bailey said it was unnecessary to speak of the treatment of acute cases at the front, as all were doubtless familiar with the achievements of Colonel Salmon in this direction. The treatment of the chronic or inveterate military cases, a distinct reconstructive problem, required a careful classification of the patient's personality, a hospital treatment where, after all physical needs were attended to, the atmosphere was such as to change the patient's point of view. This was done by explanation, encouragement, and by any of the adjuvants of suggestion. In the hospital the patient should be brought as quickly as possible to do things for himself. The mobilization demonstrated a degree of feeble-mindedness in this country which, while not far out of accord with the previous estimates of experts, took most thinking men by surprise. Moreover there were more mental defectives rejected at draft boards and camps, or discharged soon after enlistment than any other neurological or psychopathic patients. They constituted 29 per cent. of all neuropsychiatric rejections among whites, 49 per cent. among blacks. The total number exceeded 24,000, of which Maryland had the highest proportion and Arizona the lowest. In certain sections large numbers of them were foreign born. There was little doubt from attempts to train mental defectives during the war that the future interests of the country would best be subserved if they were not accepted for military service. Both State and Federal Governments should take up the problem of feeble-mindedness immediately. It was for them to realize that the feeble-minded were useless, costly and dangerous if left to themselves, as for the most part they now were, could be useful as agents in food and other supply under proper management segregated on farms. The lesson in reconstruction to be drawn from the war in this respect was that a livelier interest in this great problem which was almost untouched, should be aroused, and that all possible help and encouragement should be extended to governmental and social agencies which were trying to

care for this class of individuals. The basis of the whole sociological program was the recognition and classification of subnormal personalities, and a supervision in accordance with the varying needs of the different classes. If there is any one point at which intensive psychiatric and psychological study should begin it was not difficult to be certain where that point was. It was in childhood and early adolescence. The principle of psychiatric and psychological classification of subnormal children should be widely extended. It should be followed by assignment to special classes for such as could be benefited by such classes (90 per cent.) and institutional care for others. At the end of the school period the subnormal child should not be turned loose on the community but placed under a parole system directed by a suitable commission, and in the event of their failure, committed to an organized institution, where they could receive the training denied them at home. The educational departments of our states and municipalities were therefore the most promising agencies in the control of the menace of nervous and mental disease and criminality. But they could not do this unless we of the medical profession interested ourselves in their problems and assisted them by supplying competent advisors and workers. If all the various measures outlined were adopted, one would be safe in predicting an immediate drop in our insane rate, criminal rate, and an increase in our productiveness. One reason they had not been adopted would be found in the indifference on the part of the medical profession to nervous and mental disease. Medical schools and general hospitals gave most meager and grudging representations to neurology and psychiatry. Indeed we were so far behind in these matters that there was a question if American neurology and psychiatry would ever attain the position they should have unless there was established a special foundation for research and teaching.

Savage, G. H. MENTAL DISORDERS OF OLD AGE. [Lancet, Med. Soc., June 14, 1919.]

Savage, discussing the lines of decay, refers to Oliver Wendell Holmes's reference on dissolution, but points out that the human body dissolves in parts and not along the lines of the "old shay" which was so marvelously built that every part of it would just last one hundred years, when it dissolved and disappeared. He also points out the importance of the hereditary quality of old age and of the diseases of old age and that devolution is not as regular as evolution. It is of importance to recognize that what might be called the most essential function or element of mind—memory—is one of the first to suffer. A morbid loss of memory may prove of considerable importance from a medico-legal point of view, as in the case cited of the man who had four sons and made a will leaving his money to all four, although three of them were already dead. The effects of mental denudation are illustrated

also in the case of the father who received his prodigal daughter with open arms, only to turn against her again later and cut her out of his will. Or in the case of the old man of 74, who after living happily enough with his wife for forty years and more, began to threaten her life on account of an incident which had occurred forty years previously and which he had forgiven at the time. Other cases occur in which a man's memory may be extremely bad and his will capacity quite good. In giving a certificate as to testamentary capacity, it is not necessary always that the memory should be good. On the other hand, the loss of memory may be only temporary. In other cases, recent happenings may be forgotten while older experiences are vividly recalled. The author cites several cases in illustration and shows that loss of memory with denudation which is supposed to be associated with loss of brain function, may be very dangerous. He then turns his attention to another feature, that of loss of control, reminding us that years ago Huhlins Jackson pointed out that there was layer upon layer of the nervous system, that the last developed was the highest in function, the great controller, and that by the removal of something, power seemed to be increased; that is, control being removed, the next function or part of the brain reacted to stimuli much too vigorously, so that with loss of control there was often exaggerated action. One of the most troublesome of the minor symptoms to which this loss of control leads is the restlessness of old age; *e.g.*, the old man of from 60 to 80 with grandiose ideas who wants to marry or is for ever starting new schemes. Another feature is the sleeplessness of old age. The hysterical emotional condition is another serious complication which not only lays the aged open to undue influence by others, but leads to many sexual complications and indecencies. Again, there are the cases of mental depression or senile melancholia, obsessed with imaginary bodily or mental troubles; and the cases of what the author calls the "saturated solution of grief," as, for instance, the bishop who feels he was never fit to be a bishop, the old doctor who thinks he has aneurysm or cancer, the business man who imagines he is ruined. "Every senile melancholic is a suicidal person" is an axiom of the author's, which is particularly true of the mercantile man who believes he is ruined. Finally, the author takes up the hallucination group, in which there is pure sensory disorder. In such cases the same symptoms occur both with evolution and dissolution; the youth on the road to dementia præcox suffers from hallucinations of smell and of sight very similar to those met with in the aged, and here the author points out that the organ of smell, though a lower one, is very highly organized and is closely associated with our whole mental stability and mental growth. A study of the cases cited, as the author states, teaches the importance of learning one's limitations, and not only one's own but normal limitations. He points out, however, that lots of people, though old, are useful, and that a person who has had energy enough

to live to 80, probably has a reserve energy which can be called upon when required. He would therefore consider a patient who broke down at the age of 60 more hopefully than one who broke down mentally at 16. He adds that we must remember that many of the best, brightest, and most intellectual people die "at the top."

Gosline, H. I. RELATION OF TUBERCULOSIS TO DEMENTIA PRÆCOX.

[Journ. Lab. and Clin. Med., Jan. and April, 1919.—Edit. J. A. M. A.]

Gosline presents a preliminary study in the January issue and a detailed series of protocols in the later issue of the same journal. He is inclined to find, in the frequent occurrence of tuberculosis with dementia præcox and the concurrence of initial or recurrent symptoms of both the physical tuberculous disturbance with the beginning or the return of signs of mental disturbance, a rather definite relation of cause and effect. He tends to lay the weight through his findings upon the future possibility of discovering tuberculosis as a causative or perhaps very often the causative factor of a special type of dementia præcox.

Whether this conclusion is preferred to the inclusion of this as only a concomitant syndrome group associated rather, as has been said, through a type of personality to which they both belong, does not alter the importance of the subject as a field for study. Nor does it lessen the value of this preliminary investigation of actual facts upon which further advance must rest. The author's attempt is to examine into the statistical facts which exist in this connection in order that we may better understand what the actual relationship may be. In order to make this as accurate and convincing as possible he has carefully weeded out all those cases from his study in which alcoholism, syphilis, or any other infectious disease might have been involved in the onset of mental signs of dementia præcox or those which might have belonged elsewhere than in the grouping of dementia præcox or in which a doubtful diagnosis was present. There remained thirty undoubted cases of dementia præcox which had come to autopsy; twenty-two of these patients, or 73.3 per cent., died of tuberculosis. Seventeen of the patients examined showed a strikingly close connection between the course of the tuberculosis and of the mental disturbance. These cases the author will submit to a more intensive study by themselves, since this type has been considered by Claude and Rose in France among the toxic infection psychoses. Gosline feels justified, for the present at least, in including these cases as dementia præcox. Two things stand out particularly in the brief summary made of these cases here, the brief period from the onset of the disease symptoms and the fatal outcome and also the predominance of the third decade as the age of both onset and conclusion. All these patients died of tuberculosis except one, and this one showed gangrene of the lungs with tubercles at the apex.

Among the other cases the ages of admission and death were widely separated, as well as the ages of onset and admission. They belong either to those mild cases which gradually deteriorate until they are finally sent to the hospital, or which recover there from an acute attack but not sufficiently to be free again. The causes of death here were found to be varied, but in all there had been clinical evidence of tuberculosis, or at autopsy there was anatomical evidence either existent at death or previously. As far as clinical symptoms could be correlated with active mental symptoms these cases tend to show that the latter become active during the active progress of tuberculosis or subside when the latter process abates. The course of the physical symptoms in general is marked by a similar course in mental symptoms. Of course, it was not possible to anatomically locate the traces of older lesions to correspond in time with former mental disturbance, but clinical evidence of such correlation was available.

The writer believes that "special complement fixation tests on the blood and spinal fluid and special cultural methods applied to such cases should yield a large proportion of positive results and give us an added advantage in early diagnosis."

Laroche, G., and Richard, G. LOW BLOOD PRESSURE IN IDIOCY. [*Ann de Med.*, May, 1919.]

Microsphygmia seems to be almost the rule in feeble-mindedness. The mechanism and causes seems to lie in a hypertony of the sympathetic nervous system.

Graves, T. C. RESPONSE TO CALCIUM IN MANIACAL STATES. [*British Medical Journal*, April 5, 1919.]

Graves tried the administration of 0.6 gram of calcium lactate by mouth three times daily with food in a series of patients showing various degrees of excitement. He observed that there was a marked reduction in the excitement noticeable within the first twenty-four hours of treatment, the acute mental symptoms being alleviated without the production of stupor which is so common following the use of most of the sedatives. In the majority of patients the circulation has also been markedly improved and an intercurrent diarrhea promptly checked. No untoward effects have been observed.

Graves, T. C. PRELIMINARY NOTE ON THE RESPONSE TO CALCIUM SHOWN IN MANIACAL STATES.

The action of the drug became evident at least during the twenty-four hours following its exhibition. The acute mental symptoms were alleviated without the production of the stupor so commonly observed resultant from the action of the "sedative" drugs—if, indeed, they produce any effect at all in many cases. The circulatory response has

been equally interesting. Instead of the rapid, at times almost uncountable, pulse with its flaccid artery and variable but always low systolic pressure, the pulse becomes slower, the artery normally constricted and the pulse wave stronger, indicative of an improved action of the ventricular myocardium.

The action of the drug has been equally satisfactory in the distressing restlessness and excitement of agitated melancholia and confusional states as with the simple mania. Those cases in which influenza has been assigned as the principal cause have reacted well to the drug. These cases had resisted ordinary sedative treatment, but with this definite addition of calcium to the diet—for that is what the treatment amounts to—a vicious circle seems to have been completely broken, and they are making good progress towards recovery. Many of the other cases in whom, owing to the duration of the character of the mental disorder, complete recovery can hardly be expected, have nevertheless shown amelioration of the more acute symptoms, which may well be a determining factor in leading to an improvement of variable degree.

So far Graves has given 10 grains three times a day with food, and when a response has been obtained dropping the dosage to 5 grains. In one particularly distressing case of agitated melancholia in addition to the doses by day one or two doses have been given at night. It was interesting to note that in one case of mania with a diarrhea not only was the restlessness and excitement allayed, but the number of stools passed fell from six to one. So far no untoward effects of any kind have been observed, and, considering the small doses employed, these can hardly be expected if careful observations on the pulse are made.

Gorriti, F. DEMENTIA PRÆCOX AND RACE. [Prensa Med. Argentina, March 10, 1919.]

There were 1,410 cases of dementia præcox at the National Insane Asylum of Argentina representing twenty-six nationalities. Over 50 per cent. of the total were foreigners. The principal contingents are Spanish, 279 to a population of 512,742; Russian, 32 to 54,956 and Italian 275 to 587,497. Many of the demented born in Argentina have foreign parents. The author concludes that immigration is an important factor in mental disease. The persons that emigrate are usually more adventurous and unstable, easily influenced by the example of others and liable to suffer more from the change in customs and habits, the disappointments and hardships of the new life, especially in the large cities where there is much difficulty in finding employment.

Obituaries

MAX LEWANDOWSKY

On April 4, 1918, the cause of neurology and psychiatry experienced a loss of more than usual significance. Max Heinrich Lewandowsky, a man still young and endowed with abundant energy determinedly directed toward scientific knowledge and its advance, died in a sanatorium at Berlin, his career cut short by an acute illness.

He was born in Berlin in 1876 where his father and uncle were already in high repute as physicians. Lewandowsky showed even in his early student days an active interest in scientific study and gave promise of his later brilliant attainments. His university days at Marburg were passed under the philosophical influence of Hermann Cohen, to whom he owed inspiration and direction of his ability and interest into the critical work which later marked his activity. He had entered the university at the age of 17 and at 20 he was ready to publish his first scientific work upon regulation of the function of breathing. His thesis for his degree in medicine, taken two years later, was written upon the vagus control of the lung.

His studies in physiology led him in time to the investigation of the finer structure of the brain and of the nerve tracts of the brain stem. This work was done in Vogt's laboratory. He continued his studies later, as his interest in clinical subjects grew, by a course in clinical psychiatry in the clinic of Bonhoeffer and Nissl at Heidelberg. He obtained later in Paris a more general knowledge of neurological progress in the Marie clinic and after his return to Berlin pursued his psychiatric studies with Ziehen at the Charité clinic. Here he devoted himself in his specialty but devoted also much of his time to the investigation of physiological function of the nervous system and also to publication. He received an appointment as professor at the age of 29. He is widely known as founder with Alzheimer in 1910 of the "Zeitschrift für die gesamte Neurologie und Psychiatrie" to which he zealously devoted himself. In 1907 he had completed a large work on the functions of the central nervous system and in 1911 he began the publication of his Neurological Handbook.

He was a man of genuine scientific zeal able to turn his abun-



Levanidovskiy



ELMER ERNEST SOUTHARD

dant energy directly upon the task in hand. He directed all the wealth of his intellectual equipment, accurate, keenly critical, sure in its ability to distinguish what is essential and fundamental, to the problems of investigation, to the handling of clinical situations and to the setting forth of scientific results. This was evident in his teaching, in his writing and in his performance of his task as editor. His interest in physiological investigation was that of establishing a secure basis upon which pathological situations could be studied.

He applied the same persistent critical zeal and the determination to stop at nothing less than the truth in his attack upon the problems of neurology and psychiatry which arose during the war. He was unsparing in his criticism of the early mistakes made in regard to the "war neuroses." He not only argued vehemently for the correct understanding of the problems of war neurology and psychiatry but as soon as these were becoming accepted in accordance with his practical views he obtained permission to proceed to the front in order to throw his influence into rousing this greater understanding and efficiency upon the field. He was given the direction at first of the Berlin neurological hospital and in the summer of 1917 sent to the western front. Later he was transferred to the Near East but here he suffered a severe attack of typhus fever. He remained for a time in the hospital at Bucharest but was obliged to return to Berlin because of severe cardiac involvement and arrived home broken down physically and psychically. The end came suddenly, breaking off in its midst a life of greatest promise to the future of neurology. Nevertheless the attainments of his manifestly great capacity and the well-directed control of his powers to the work in hand had already formed a contribution to neurology which had promoted its progress and which will serve as a stimulus and guide to those who still labor.

SMITH ELY JELLIFFE.

ELMER ERNEST SOUTHARD

The death of Elmer Ernest Southard caused an acute sense of loss to our JOURNAL because of the peculiar force of his personal friendship and also because of his close association as a member of the editorial staff and as an active contributor to its material. He died in New York City on February tenth, after an illness with pneumonia of only two days. He had come to New York to be present at the annual meeting of the National Committee of Mental Hygiene and had just given an address before the New York Neurological Association two days before he was stricken.

Dr. Southard was a man of wide and varied interests and his activity in any direction was characterized by the abundant energy and forcefulness which he everywhere displayed. He combined brilliant and facile powers of expression with a determination of purpose upon whatever claimed his attention so that he made his influence felt and aroused others to thought and activity wherever his interest was applied. This was true in his own study and investigation, in his teaching and writing and in his devotion to practical measures of public welfare. He could strongly champion any cause or any point of view he made his own and could with equal vehemence oppose such as he considered illadvised or mistaken. His brilliancy of expression led him sometimes too readily into certain extremes of controversy which were not always convincing. Yet they too never failed of giving stimulus to those who agreed or those who opposed, for his spirit was too constructive to fail always in giving its incentive to the furthering of thought and practice.

Dr. Southard was born in Boston in July, 1876. His student life was already marked by a versatility which stood in the service of an earnestness of purpose and interest. This made this period one of acquisition of a wide material and of training in the pursuit of his various interests which gave his after work its peculiar richness and value. He was trained first in the public schools of Boston and finally prepared for college at the Boston Latin School. He received the degree of A.B. at Harvard in 1897 magna cum laude. He was deeply interested in psychology and philosophy and after graduation obtained special honors in philosophy. He was associated with the teaching both of James and Royce and continued his studies with the latter even after he had entered upon his medical career. He owed to this study with Royce much of his forceful manner of speaking and writing and an incentive to discussion of many of the subjects which were later published to the world. As a student he showed unusual skill in chess, which he played as an expert amateur and as a chief means of relaxation in his hard working years.

Dr. Southard's medical education was obtained first at the Harvard Medical School where he received the degree of M.D. in 1901. After a term as pathological interne at the Boston City Hospital he went for a time to Frankfort and Heidelberg. He was again associated with the Boston City Hospital in pathology on his return, while in 1904 he became instructor in neuropathology at the Harvard Medical School. He remained here until his death, becoming assistant professor in 1906 and Bullard professor of neurology in 1909.

As a teacher his originality and force of personality gave his course of instruction a unique character and helped to give the subject of neuropathology eventually a department of its own. He published in 1906 the "Outlines of Neuropathology" in which he set forth these methods.

His interest had been directed to a study of the neuroglia by his work with Weigert while in Frankfort and by the work later of Mallory upon that subject. He had worked also with Nissl and Kraepelin in Heidelberg where he was stimulated also to psychiatric problems. These two interests were major ones with him for the rest of his life. He began his special work in psychiatry at the Danvers State Hospital where he was a frequent and regular visitor and in 1906 was appointed pathologist and assistant physician there. His work here combined psychiatric study with neuropathology and resulted in great stimulus of interest both through his associates and through a large number of published reports in which he shared.

In 1909 he was appointed pathologist to the Massachusetts State Board of Insanity through which he came into close association as supervisor with the work of all the hospitals for the insane in his state. He became director of the Boston Psychopathic Hospital in 1912, after devoting his energies for several years to its establishment. He had urged through his various publications at this time an ideal of such a hospital which it was his endeavor hereafter to carry out. This was the establishing of the psychopathic hospital as a center where the "nature, causes and treatment of insanity" could be studied together. This idea was furthered by his interest in establishing social work and nursing in connection with psychiatry, a work which was instituted and carried to great success in connection with this hospital. He also participated in organizing such work at Smith College in 1918. He took an active part also in industrial psychology, seeking always to enlarge the practical field of his own profession.

His many publications testify to the variety of his interests, the breadth of intellect and of learning to which these were all submitted and the zeal with which he pushed each one of these interests into paths of actual service and progress. The number of his smaller publications exceeds 150 writings. Two recent books present the results in larger form. These are his book on "Neurosyphilis" written with Dr. Solomon and his later work on "Shell Shock and Neuropsychiatry." Other books were in the course of preparation at the time of his death.

He made his interest in philosophy and in linguistics of direct service in his study of neurological and psychiatric questions.

Dr. Southard was on the editorial board of the *American Archives of Neurology and Psychiatry*, the *Journal of Abnormal Psychology*, the *Journal of Clinical and Laboratory Medicine*, beside occupying a similar position upon the editorial board of this JOURNAL. He was a member of many societies for the promotion of the interests in which he was engaged. He is survived by his wife, Dr. Mabel Austin Southard, and three children.

It is the passing of such a life as his not out of the world but through the world that should claim attention. A career such as his is not to be measured even by the years of usefulness which might still have been his. It is to be counted rather in the amount of work already achieved but even more in the stimulus and impetus given to intellectual, social and professional study and service of the highest type and widest scope. One who has lived so thoroughly has left an imprint upon the lives of others and better still has set other lives themselves upon the path of similar activity.

SMITH ELY JELLIFFE.

The Journal OF Nervous and Mental Disease

An American Journal of Neurology and Psychiatry, Founded in 1874

Original Articles

TWO DIFFERENT TYPES OF EPIDEMIC ENCEPHALITIS: THE LETHARGIC AND THE MYOCLONIC FORM OF THE DISEASE

BY PIERO BOVERI, M.D.,

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The systematic and comparative study of many cases of encephalitis, which we are prosecuting at present at the Principal hospital in Milan, allows us to determine the clinical types of this interesting disease.

Besides the form which we will call the *classical form* of lethargic encephalitis, in which lethargy, fever and ocular paralysis are the cardinal symptoms, we must also consider other clinical varieties, less frequent but greatly different.

While in its usual form everything tends to torpor, sleep and paralysis, we can sometimes observe cases in which the symptoms are, on the contrary, excitement, delirium and myoclonia.

The two following cases are of this second type (*myoclonic type of Epidemic Encephalitis*).

CASE I. A girl, aged 19, entered the hospital on the 21st of January last. No hereditary antecedents. She had influenza with broncho-pneumonia in October, 1918, and typhoid fever in January, 1919.

On January 17 she began to feel great pain in the muscles of the neck and shoulders. A few days later she had fever and delirium. On entering the hospital her symptoms were: Light cyanosis of the face, irritation of the ocular conjunctives, irregular contractions of

the hands, delirium, temperature 38.2° C., pulse 104, respiration 26, arterial blood pressure 145 mm. Hg. (Riva Rocci). No paralysis of the eyes nor of the cranial nerves. Pupillary reflexes to light and to accommodation present and well maintained.¹

Cutaneous and tendonal reflexes normal. A lumbar puncture gave the following result: Liquid perfectly clear at almost normal pressure; albumen just noticeable; Nonne and Boveri's reaction negative; six lymphocytes per cu. mm. to the cell count (*Cellule de Nageotte*). Blood and spinal liquid cultures gave negative results.

The patient remained in this condition for about ten days. On the 4th of February *short and rhythmical contractions* appeared, which could be compared to *electric waves* in the flexing muscles of the arm and of the hand and fingers on both sides, but mostly on the right side.

These rhythmic movements are 66 to 68 per minute (P. 92, R. 22, T. 37° C.).

In the right thigh a contraction of the quadriceps was observed which produced attempts at flexion of the thigh. No sensory troubles. Two days later, to the above movements light contractions of the diaphragm were added which produced inspiratory contractions, synchronizing with the contractions of the arm. These movements remained even during sleep.

There was no lethargy. The pupillary reflexes to light and to accommodation were always regular; no visible paralysis of the cranial nerves.

This is the present condition of the patient who now has pain in the arms, temperature between 36.4° and 37° C.

CASE 2. A woman, aged 40, entered hospital on the 16th of February last. No hereditary antecedents, no influenza. On the 25th of January there had been great pain in the arm and shoulder on the left side, which passed on to the right side and to the wall of the abdomen. Shortly after, rapid and rhythmical muscular contractions appeared, which convulsed the patient. There was delirium, with slight fever, no lethargy, no affection of the ocular motion nor of the sight. On entering the hospital this woman, of average physical development and well nourished, offered a *most myoclonic symptomatology*. The *sterno-cleido-mastoid* and *trape-*

¹ See P. Boveri, "Abolition du Réflexe de l'Accommodation dans l'Encephalite Léthargique," Société de Neurologie de Paris, Séance du 4 mars, 1920.

In the above work Boveri states that in the lethargic form of encephalitis, one of the first and most important signs is the paralysis of pupillary accommodation, while the pupillary reflex to light may be maintained. This sign would not be present in the myoclonic form of epidemic encephalitis.

zoid muscles of the right side and the *diaphragm* presented *rhythmic contractions*, 48 per minute.

She perspired freely, was agitated and delirious, no paralysis of the ocular and cranial nerves. At the lumbar puncture, clear liquid with increased pressure, albumen 0.2 per cent. (Rachialbuminometre de Sicard). Nonne and Boveri's reactions negative, five elements per cu. mm. to the cell count (Cellule de Nageotte) ; T. 37.8°-38° C. No symptoms in the lower limbs. All reflexes normal.

Five days later the contractions of the neck disappeared, whilst in the wall of the *abdomen* strong *rhythmic convulsions* were observed, which never for a moment left the patient.

Synchronizing with the abdominal and diaphragmatic convulsions, the *right thigh* presented rhythmic contractions of the abducent muscles and sometimes of the sartorial muscle.

All these muscles are painful, as well as the back and the whole arm. Such is the patient's condition at present.

The new and striking symptoms of these two cases consist of myoclonic convulsions, both rhythmic and partial, as though produced by an electric current.

We can therefore speak of a *myoclonic type* different from the *lethargic type*, at least at a certain period of the disease.

Thus, waiting for the etiological moment to enlighten us, we ought to speak of *Epidemic Encephalitis* in general, to which might be added a lethargic or myoclonic type according to the different symptoms noted.

On studying this myoclonic form of encephalitis, we naturally ask whether we are in the presence of the disease described by Dubini and called by him "*Electric Chorea*."

This disease has not been mentioned since Dubini's time, 1840-1870. Dubini presented to his seventh meeting of Italian scientists (1846) a memorandum describing a new disease of which he had studied thirty-eight cases in a period of nine years. It is, Dubini writes, "nearly always a fatal disease," characterized "by muscular contractions occurring at different intervals, but always identical in each case, as if produced by a repeated electric current. These convulsions, affected at first a finger or limb (more frequently the upper limb on the right side) or a half of the face (the right half) and in a few days invaded the whole of that side of the body." Dubini adds that, as well as these rhythmic movements, two or three or even more times a day, one can observe convulsive attacks which repeat themselves every day, giving way afterwards to paresis and

paralysis. Dubini's description was followed by those of Frua (2), Morganti (3), Pignacca (4), Stefanini (5), Behrend (6) and, later, Grocco, 1884 (7).

But, however well these scientists had observed the symptoms of this disease, they were not able to understand them, on account of the limited knowledge of pathological anatomy at that time, for we must not forget that they lived about the middle of the last century.

Reading all these memoranda to-day, we see described under the name of Dubini's disease a great number of cases which could better be classed as typhoid or malarial fevers or Jacksonian epilepsies.

But, without entering into this question, it really seems to us that Dubini's disease might be connected with the myoclonic form of epidemic encephalitis, as we see it at present. It is also interesting to observe that in the two cases described above there were no pupillary affections to light or to accommodation tests, and that the ocular movements were also normal.

The different symptomatology between the lethargic and the myoclonic types suggests a different pathological localization of the virus. In the lethargic form the centers of encephalitis are localized, particularly on a level with the central peduncles, and the locus niger. It is a question whether, in the myoclonic type of the disease, the centers might not be localized in the opticus thalamus in different degrees in a transitory manner?

We are waiting for new discoveries in pathological anatomy to enlighten us on this point.

MILAN,

March, 1920

1. A. Dubini. Primi Cenni sulla Corea Elettrica, VII Congresso degli Scienziati Italiani in Napoli; *Annali Universali di Medicina*, Gennaio, 1846.
2. Frua. Del Tifo Cerebrale convulsivo—Corea Elettrica del Dott. Dubini, *Annali Universali di Medicina*, Vol. 144 and 145 (1853).
3. Morganti. *Gazetta Med. Lomb.*, 1853-1854.
4. Pignacca. Della Corea Elettrica osservata in Pavia dall'anno 1848 al 1854; Pavia, Tipogr. Fusi, 1855.
5. Stefanini. Sulla Corea Elettrica, *Annali Universali di Medicina*, 1875, p. 201.
- Nuovi Fatti alla Contribuzione dell'Anatomia Patologica della cosi detta Corea Elettrica; *Annali Universali di Medicina*, Vol. 253; p. 493, 1880.
6. Behrend. Ueber Spasmus Dubini oder Sogenante Chorea Electrica, *Journ. f. Kinderkr.*, XX, 34 (1854).
7. Grocco. Studi e Considerazioni sulla Corea Elettrica o Malattia del Dubini, *Annali Universali di Medicina*, Vol. 269, anno 1884.

THE BIOLOGICAL PROBLEM OF ADAPTATION

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Few people at present are occupied in putting their own houses in order. They prefer to stand like children at the window watching the passers-by, or join some procession and shout for reforms that are to be carried on outside of their own premises. The psychiatrist at present has an excellent opportunity to set a good example of the advantages of rational living. He may indicate that one sign of rationality is intelligent interest in inspecting at least the foundations of the house in which he lives. For the last five years the calls for active service left little time for reflection or inspection of the hastily planned and loosely constructed building in which he is called upon to do his work. On one side the work of the psychiatrist brings him into touch with many persons who are deeply concerned about the solution of a great many practical questions in the world, while on the scientific or more purely intellectual side he is in contact with scientific investigators who at the moment are also unsettled by the announcement that if the theory of relativity is correct, then such old landmarks in the universe as "time" and "space" are in danger of being discarded.

Even if some of the deductions from the Einstein Theory increase the difficulty of adjusting man's terrestrially formed conceptions to include conditions existing in the universe, the psychiatrist has reason to take some comfort in the fact that one principle for the establishment of which he has long contended has been strengthened by the recent advances in the physical sciences. The water-tight-compartment-age, at least in the physical sciences, seems to be drawing to its close. The different forms of energy, such as light and gravitation, are shown to be so closely related that already we are justified in speaking of energy with modifications. Perhaps the time has come when man will apply the basic principle of the relativity theory to the study of his own activities and at last will drop the water tight compartments in which he was once accustomed to include functions of mind and body.

As long as man believed himself to be in undisputed possession

of "time" and "space" and measured these functions by his own arbitrarily selected standards he was not in the frame of mind to arbitrate questions of human behavior in an open court attended by students of both mind and body. There is reason to believe, however, that at last the necessity of studying man as a biological unit will be recognized, and as the theory of relativity becomes more generally accepted those who study behavior without consciousness, as well as psychologists with only an academic interest in behavior will welcome an opportunity to unite forces in attacking the great problem of human adjustment and forever give up the idea of arbitrarily restricting the field of scientific investigation to their own special field.

The psychiatrist without delay should set an excellent and rare example of substituting for mere words in favor of a rapprochement with other investigators an arbitral predisposition, and an encouraging form of coöperative action.

But although he may be emotionally impressed with the necessity of getting rid of the fences between adjoining lots in these fields of investigation, his reason tells him to go slowly, as the barbed-wire entanglements erected by the special interests represented by psychiatrist, chemist, physiologist and psychologist cannot be removed at once. A beginning should be made, however, by estimating the extent and difficulty of the problem. Something is accomplished even by the recognition of the fact that living organisms are, according to Hooker,¹ systems in equilibrium obeying certain well-recognized physico-chemical laws. Each change in the environment produces a change in the organism that tends to minimize the disturbance. What is referred to by the psychiatrist as a stimulus, according to the physicist is the constraint by which the equilibrium is shifted. Even before the appearance of Semon's contributions to the subject of irritability it was recognized that a stimulus represents a change in relation between organism and environment; and also that any shift in equilibrium does not take place unless the energy expended is sufficient to overcome the inertia of the system at rest. Even in the simplest form of reaction a principle is involved that is universally applicable in studying problems of adjustment at all levels. The reaction takes place in order that the system be preserved. We are in a better position to appreciate the general applicability of this law when once the fact is recalled that systems may be represented in the organization of a single cell, as well as in organs, single organisms and groups of organisms.

¹ Hooker, Henry D., *Behavior and Assimilation*.

The thought is a reassuring one that investigators interested in biological problems are working on the other side of the barrier still separating the adjoining plots occupied by physicists and biologists. The physicist tells us that "an organism is a system that perpetuates itself by autocatalysis and reacts according to the theorem of Le Chatelier." The chief tendencies of this organism or system "is to preserve," not as Oswald said, its "physiological invariability," but its physiological integrity. This it does at all costs. Sometimes the return to a physiological balance is accomplished by a simple reflex, at other times affective tendencies subjectively expressed as "desires," "appetites" and various kinds of emotional and mental "needs" direct the stream of energy let loose in the effort to restore an equilibrium. The feelings of hunger, thirst, the desire to preserve life, to mingle with the herd, all persist until a certain degree of the physiological integrity has been restored. By hook or by crook the organism when stimulated or disturbed strives to take up a new position, not a state, in reference to internal and external conditions. In other words, new adaptations are formed. If these affective tendencies are not satisfied Nature makes use of sudden and violent means of securing adjustment by letting loose accumulated energies in the shape of emotions to accomplish the purpose. An emotion is a sudden and often violent attempt to restore physiological integrity. Complicated and numerous as these affective tendencies may appear to be, they are the expression of the fundamental biologic unity of the organization which tends either to maintain the balance when once established or to restore it when disturbed.

The supremacy of the nervous system in superintending these adjustments is well recognized. This new official in the cabinet, younger by millions of years than the muscular system, has taken a prominent and dominant part in the government. It is not generally known, however, that the former, a recent acquisition, seems to have much greater resisting power than the latter to destructive forces in the environment. Alfred G. Mayor has shown in medusæ that even relatively slight changes in the environment, such as the dilution of sea and fresh water, reduces the adjusting capacity of the muscle much more rapidly than that of the nervous system. Impulses can be transmitted by the nerves after the muscles have ceased to respond. Antiquity of origin and functional efficiency seem to stand in inverse ratio to each other. It is an interesting field for speculation to ask whether the relatively lower resisting capacity of the muscular system as compared with the nervous tis-

sues may not become a prominent factor in the genesis of diseases. This question should be carefully investigated and researches made to determine whether this increased vulnerability of the muscular system for changes in the environment, due to a new arrangement of the inorganic chemical constituents, holds also for alterations in organic compounds. The extreme sensitivity of the nervous elements for different toxins would seem to indicate that there may be a difference in the reaction of the muscular system to inorganic and organic compounds.

While still engaged in exploring the foundations of our workshop, may we not ask to what extent we are justified in borrowing from our neighbors, the physicists and chemists, instruments and methods as well as terms for recording the results of our studies of biological adaptations in reflex, automatic or conscious levels. The unprejudiced observer will undoubtedly say the time is not yet ripe for an advanced stage of communism. We should aim to get rid of the fence, but we should not immediately deny that private property has any rights. Haldane has shown that, as in the process of crystallization, we cannot deduce from physical laws the behavior of a molecule of water, for similar reasons deductions can not be drawn from any elementary physical or chemical process as to the behavior of living organisms. We must also politely decline the invitation to cross the fence in the hope of knowing more about the real world; for in spite of Bertrand Russell, the world of mathematical physics is a very imperfect presentation of reality. The psychiatrist's problems are just as real as any of Russell's. Sometimes by use of syllogisms or mathematical formulæ the professional philosopher and mathematical physicist may make it appear that the special subject in which he is interested is the only one in touch with reality or worthy of consideration. The world of reality is first a known world and then a biological or physical world.

The organic neurologist in his search for the real world has not always been temperate in his treatment of some of the extremely useful terms, such as consciousness and unconsciousness. Once having limited the functions of the soul to the spinal cord, he has had a serious readjustment to face. It was not many years ago that the psychiatrist, the specialist, who was not afraid to declare publicly his interest in the study of mental processes was permitted to pass judgment upon the symptoms in case of suspected paresis, provided organic symptoms were not present! All this was changed soon after Tuzek demonstrated the disappearance of tangential fibers from the cortex. The neurologist rushed in then where only

angels had dared to tread. Among the recently acquired interests of some neurologists is consciousness. Consciousness to these enthusiasts is either everywhere or nowhere, and during the rushes first to one extreme and then to the other of those whose outlook upon life was once held in check by "a spinal cord" soul the psychiatrist must possess his own soul in patience and wait for the time when we shall display temperance and common sense in discussing the problems of "consciousness" and "unconsciousness."

It is difficult for some to appreciate that consciousness as well as rational thought are forms of adjustment; as they are so frequently discussed as if they were states of mind or special faculties. Both represent methods of adaptation, which, when analyzed, are analogous to the method of "trial and error" employed by the ameba in selecting the possible and rejecting the impossible. Even our latest and most cherished possession, rational thought, a trial-and-error method, reminds us, of our lowly origin.

In a very cursory and casual manner attention has been directed to the neighborhood-interests of physicist, physiologist, psychologist and psychiatrist. The first three investigators are recognized practically officially in the United States as scientists, but not the latter. If science is only common sense at its best, is there not in the present world situation reason for officially recognizing the fact that organized common sense should be applied to the solution of the problem of human behavior as well as to the investigation of physical, physiological and psychological phenomena? We psychiatrists, students of human behavior, are partly to blame for not being in touch with the powers who often arbitrarily limit the field of scientific research. We have, for example, no representation in the American Association for the Advancement of Science. In the meetings of psychiatric societies few of the officially recognized types of scientists appear. But the fact that there is so little general interest taken in the study of human behavior is not altogether our fault. We have a difficult task to perform in educating the members of our own profession. Prejudices have to be resolved and a new symbolism substituted for the older forms. Physicians, in spite of certain materialistic tendencies, believe strongly in symbols and amulets. A writer in the *London Lancet* recently pointed out that bacteria now make as striking an appeal to the imagination of physicians as did once the serpents of *Æsculapius*. The mathematical physicist and physiologist, too, have special symbols, formulæ and apparatus. The psychiatrist is interested in the study of symbolism, but as he has not yet selected his amulets, his work is still looked

upon with suspicion. "It is the rule," says one of the most distinguished of European clinicians, "that, as bacteriology and serology have preëmpted the rights in the field of medical research, physicians have but little time, interest or knowledge to devote to the study of the conscious processes of their patients."

Although intelligent lay-people throughout the world recognize that the great problem confronting us to-day is the investigation of human emotions, physicians who still cling tenaciously to a symbolism represented by bacteria affirm that the study of hookworm and of germ-caused diseases is more scientific and should be pressed with far greater vigor and more elaborate equipment and organization than is devoted to the study of human behavior. If we are intelligent and keenly alive to the menace existing to the rational control of democratic institutions, we shall continue to insist that departments for the study of human behavior be established in our medical schools, colleges and universities in order that educated people should have some knowledge of their own personalities.

The arguments in favor of arbitrating social and international questions have been repeated with an amazing degree of persistence, but still the object of our wishes has not been even remotely realized. If less time had been expended in elaborating arguments, and more to carrying on arbitral procedures, reason to-day might be a more permanent factor than it is in the settlement of disputed social and international questions. The psychiatrist, on account of his peculiarly intimate knowledge of the influences that make rational thinking difficult or impossible, is probably better qualified than the member of any other profession to point out the kind of emotional and mental preparation essential for successful arbitration. The public should be made to understand (1) that there is a store of knowledge already gathered together by the psychiatrist that can, if rightly applied, be utilized in alleviating, if not curing, some of the symptoms of the present social unrest, and (2) that far better opportunities for research than exist at present should be provided for attacking the problems of human behavior, and active measures taken towards changing this time of unreason into an age of reason.

Loeb² has said it is "impossible to express the conduct of a whole animal as the algebraic sum of the reflexes of its isolated segments." For a similar reason it is impossible to express the conduct of the whole animal without including the phenomena of conscious-

² Loeb, J., *Forced Movements—Tropism and Annual Conduct*, J. B. Lippincott Co., 1918.

ness. Unfortunately "contamination of thought by irrelevant emotion and fathering wish" springs from the special interests and privileges developed while attacking only one phase of a great problem. This emotional preparation has made it exceedingly difficult for a good many scientific men to take a common sense view of the problems of consciousness. Never having had their interest directed intelligently to the application of dynamic psychology to the study of human conduct, they illustrate by their refusal to consider conscious adaptations, the special bias created by primitive forms of "custom-thought."

TREATMENT OF DISORDERS OF THE SPINAL SYSTEM BY THE INTRASPINAL METHOD AND ITS VALUE TO THE BUSINESS MAN¹

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The object of this communication is to offer for your consideration one possible method of meeting the several obstacles now placed in the path of the business man who seeks treatment for a nervous disorder affecting the spinal cord, by means of our modern methods.

It is quite evident to those who treat diseases of the spinal nervous system that one of the most discouraging difficulties in undertaking intraspinal treatments is the possibility of being compelled to place the patient in bed or even suffer the tortures of a "puncture" headache so frequently met in certain types of patients as well as in certain stages of the disease process. It has always been a matter of protection to place the patient in bed for from several hours to several days, to be carefully watched for a so-called "reaction," or to avoid an undue activity following the injection, or even to protect him from a headache, might he have one. It is these obstacles which prevent many patients from undergoing the latest methods of management and thus cause them to pass slowly into such stages of their disease when damage has been seriously wrought and partial or permanent incapacity taken place.

With the advance in diagnostic methods and the increase in the diagnostic acuity of the medical man, early manifestations of syphilis of the spinal cord, either sclerosis, vascular or meningitic, multiple sclerosis, etc., are now recognized and yet oftentimes the aforesaid barriers obstruct an immediate prevention in progress or eradication, if such may be had.

The question is so often asked of the clinical therapist, "Will it lay me up?" or "Can I keep at my work?" It is the feeling of the writer that it is now no longer necessary, in a large percentage

¹ Presented before the Combined meeting of the New York Neurological Society and Section on Neurology and Psychiatry of the Academy of Medicine, November 4, 1919.

of cases to either cause them to "lay up," or "be kept out of work" for any longer time than is necessary to carry out the therapeutic technique.

An attempt, therefore, will be made to sustain this statement by presenting in a concise and brief manner the technique of the writer in managing such cases as would ordinarily require care in bed following their treatment. The question of "puncture headache" will be deferred as it will be the subject for discussion in a paper to follow, later on. The discussion will include the anatomy of the intra- and extra-dural spaces as they relate to physiological processes and biochemical reactions.

The intra-dural space into which the serum, salvarsanized, meningal, etc., is injected is in reality the highly vascular pia-arachnoid mesh which is a combined serous and fibro-vascular tissue containing within its interstices the spinal fluid. It is a loose sac which has as its outer covering the more strong and fibrous tissue, the dura. The dura sends projections along the nerves which merge gradually into the epineurium of the nerve trunk.

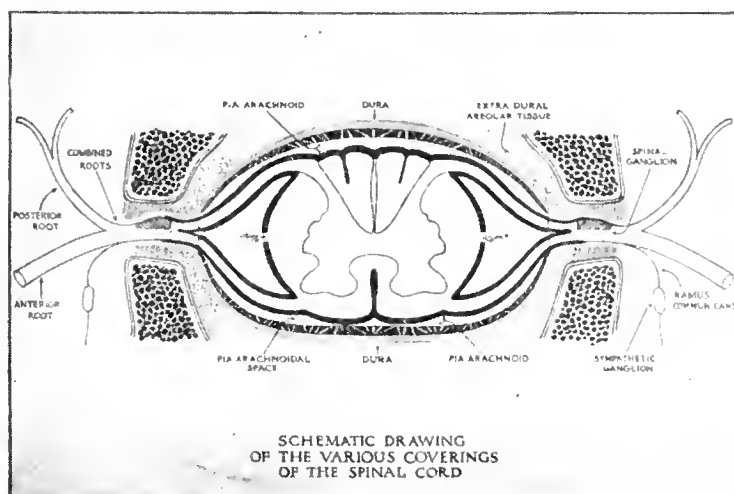


CHART I

The extra-dural space, on the other hand, is a fairly wide space containing much areolar tissue, blood vessels and a short portion of the nerve trunk before its exit through the foramina at which point the dura is attached to the ligamentous tissue covering the inner surface of the vertebræ (Charts I and II).

Both the intra- and extra-dural spaces are richly supplied with blood vessels, there being more posteriorly than anteriorly. The vessels, anterior intercostals, for example, enter by the intra-vertebral foramina and after giving off several small branches pierce the dura

to be distributed to and through the pia-arachnoid to the cord. The corresponding venous distribution follows much the same course as the arteries, reversely. In addition, however, there are venous plexusi both in the extra- and intra-dural spaces. The extra-dural venous plexusi are found in the meshes of the areolar tissue and communicate with both the epi-vertebral venous plexus and the intra-dural venous plexus. The lymphatics are of the perivascular type and follow the vessel sheaths.

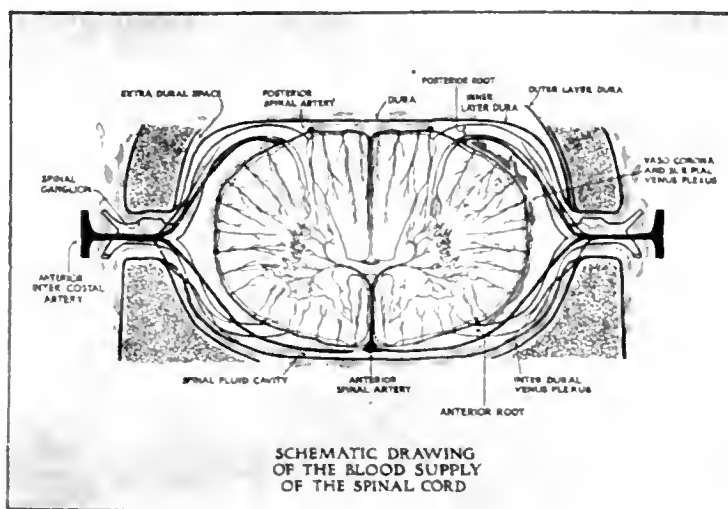


CHART II

One observes thus far, that one of the distinct differences between the intra-dural and extra-dural spaces is the predominance of areolar tissue in the extra-dural space. In general pathology it has been demonstrated that areolar tissue is a valuable asset in absorption, as is manifest in effusions into such tissue and the ease by which substances when introduced into areolar tissue are taken up. MacCullum noted, by using a silver stain, that the ground substance of all areolar tissue contained broad lymphatic channels lined by delicate endothelial cells, an important factor in absorption.

Let us at this point digress and consider a further possibility in the discussion of the phenomena of absorption. The serum used in intra-spinal treatment has, as a most general rule, been inactivated, a process which destroys some elements in the serum and also, undoubtedly, changes the molecular constitution of its contained albuminous ingredients. In the dialyzing tube in the laboratory this type of serum will pass through an animal membrane. May such a condition not be present in the human being when an inactivated serum is introduced into the extra-dural space? At all events, with this possibility and the valuable absorptive powers of areolar tissue,

the writer began his treatment of the business man who suffered from disease of the spinal nervous system by injections of inactivated salvarsanized serum into the extra-dural space, whereby a serum was introduced without the removal of spinal fluid.

*Types of Cases Treated.*²—Early cases of tabes dorsalis whose response to intravenous injections was poor (after ten to twenty weekly injections); special cases of early syphilis of the cord (type difficult to differentiate), where difficulty in urination was the initial disorder; fairly advanced cases of combined sclerosis due to syphilis with poor bladder retention; early cases of multiple sclerosis with bladder symptoms; cases of the exudative form of meningo-encephalitis with a tabetic symptom-complex.

Chief Symptoms and Complaints.—Shooting pains in the legs; paresthesiæ of the legs and feet; creaking knee, elbow and wrist joints; stumbling in walking; difficulty in passing water; difficulty in holding water; loss of power of penile erection; gastrico-hemicrisis; ulnar paresthesiæ; bilateral weakness of hand with cramps.

Physical Symptom-complex.—The neuro-physical symptom-complex varied in type from that of a frank tabetic to those who only showed scattered signs such as unequal pupils and one absent Achilles jerk, or merely one lost knee jerk and one case where the only two symptoms were inability to pass water and a complete loss of erectile power for a year prior to his first visit.

Serological Findings.—All cases presented a positive Wassermann in the blood serum. All the cases showed an increase in the cell count from 12 to 75 per cu mm. in the spinal fluid; only fifty per cent. gave a positive Wassermann in the spinal fluid. (The writer has occasionally observed that an initial negative Wassermann in the spinal fluid in manifest syphilis of the spinal cord frequently becomes positive under treatment and at a variable time again becomes negative where the reaction seems to remain.)

Time of Infection.—The time of infection has varied from five to twenty or more years past, since the appearance of their chancre.

During the last year fifteen patients have been treated at intervals by this method of the non-removal of spinal fluid who have fallen into the group of cases aforesaid. Eleven have been males and four females. Their ages have ranged from thirty-five to fifty.

Of this number of patients ten have responded well to this method of treatment and are now free from practically all symptoms which led to their seeking therapeutic advice. The remaining five

² These patients are all private cases; hospital cases not included.

are sufficiently improved to continue at their business but still return for treatments.

Untoward Symptoms.—The only symptoms which might be recognized as untowards are a sense of stiffness in the spine limited to the lumbar region; a feeling of tension in the back of the neck with what might be called a “meningeal headache.” This untoward symptom occurred in only one patient and followed within two hours after the injection which was introduced very rapidly. A symptom of infrequent occurrence is one of numbness extending down the back and outer side of both thighs.

Technique of the Writer.—The salvarsanized serum is prepared in the usual manner following the intravenous injection of salvarsan, waiting one half hour; drawing blood into sterile tubes, allowing to stand, then centrifuging and pipetting serum into ampules which are sealed and placed in a water bath at 55 degrees Centigrade for one hour. From 20 to 40 c.c. of serum is obtained for the injection.

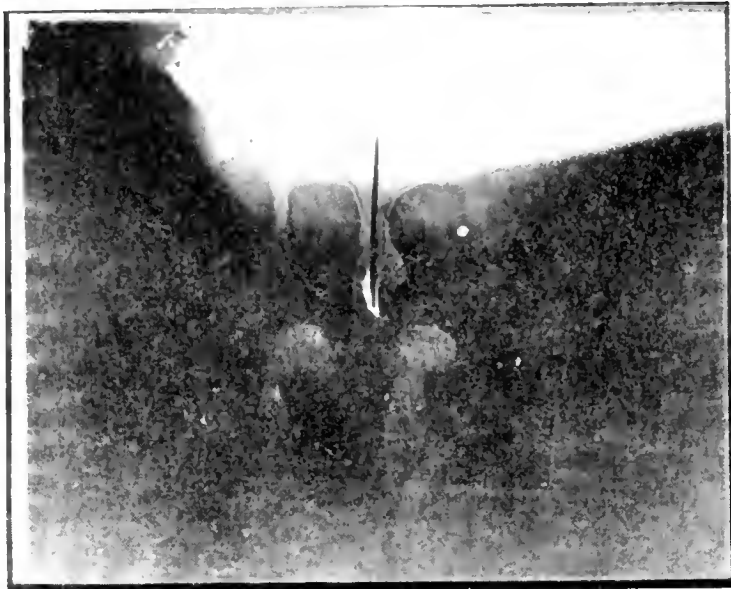


CHART III

Patient comes to the treatment room at an appointed hour during the day (during business hours), and is prepared in the usual manner as that described for intraspinal treatments according to the Swift-Ellis Method. The patient is placed in either the sitting or recumbent side position. After the usual preliminary cleansing of the region of the first, second or third lumbar spaces, a needle is introduced into one or the other of said spaces to such a distance, which to the touch of the examiner and probably to an accompanying visualization of the space, it is considered outside of the dural

sac; it *does not* pierce the dura but leaves the bevel point of the needle in the extra-dural space (X-ray plates, comparative, No. I and No. II). The serum in the meantime has been transferred to a large piston glass syringe not necessarily diluted with saline and said syringe is then attached to the needle and by slow but firm pressure the fluid is introduced into the extra-dural space. The examiner takes from three to seven minutes to introduce the fluid into this space in order to avoid such untoward symptoms as might occur

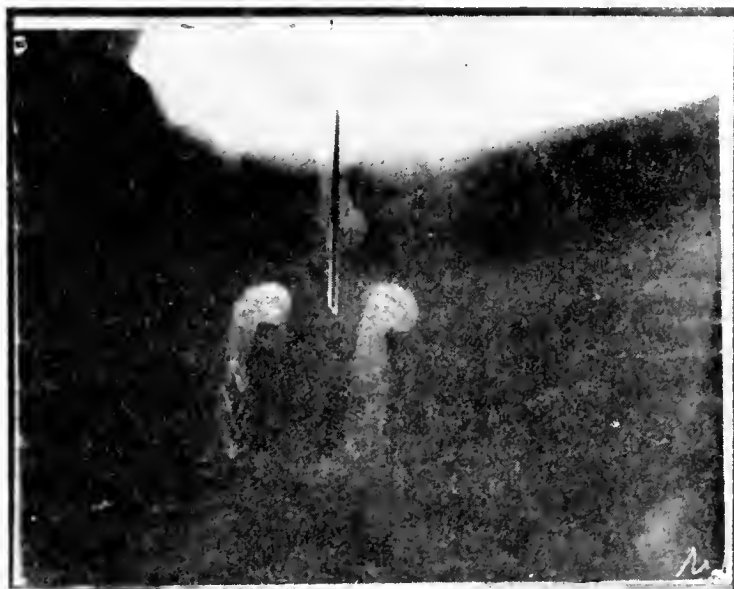


CHART IV

from too rapid an injection. One may remove the syringe from the needle and notice that pressure extra-durally is practically nil, although if it be introduced rapidly there may be some pressure which will cause the serum to ooze out through the needle. The needle is then withdrawn and the technique followed as in the usual run of spinal puncture cases. The patient dresses immediately and goes back to his business and is, as a rule, not heard from until the day of his appointment.

In patients in whom the bladder symptoms were most marked it was rather surprising to see the rapidity with which their bladder symptoms returned approximately to normal under this method of treatment. A series of comparative cases in which the unmodified intra-spinal treatment, or better, usual intra-dural treatment was used, those which received the extra-dural injections seemed to improve more rapidly. The question might then arise whether the mechanical process of distention with a tension upon the dura-epineurium attachment might not be a factor in hastening improvement

by the extra-dural method, such as is seen in Strauss' epidural treatment for sciatica.

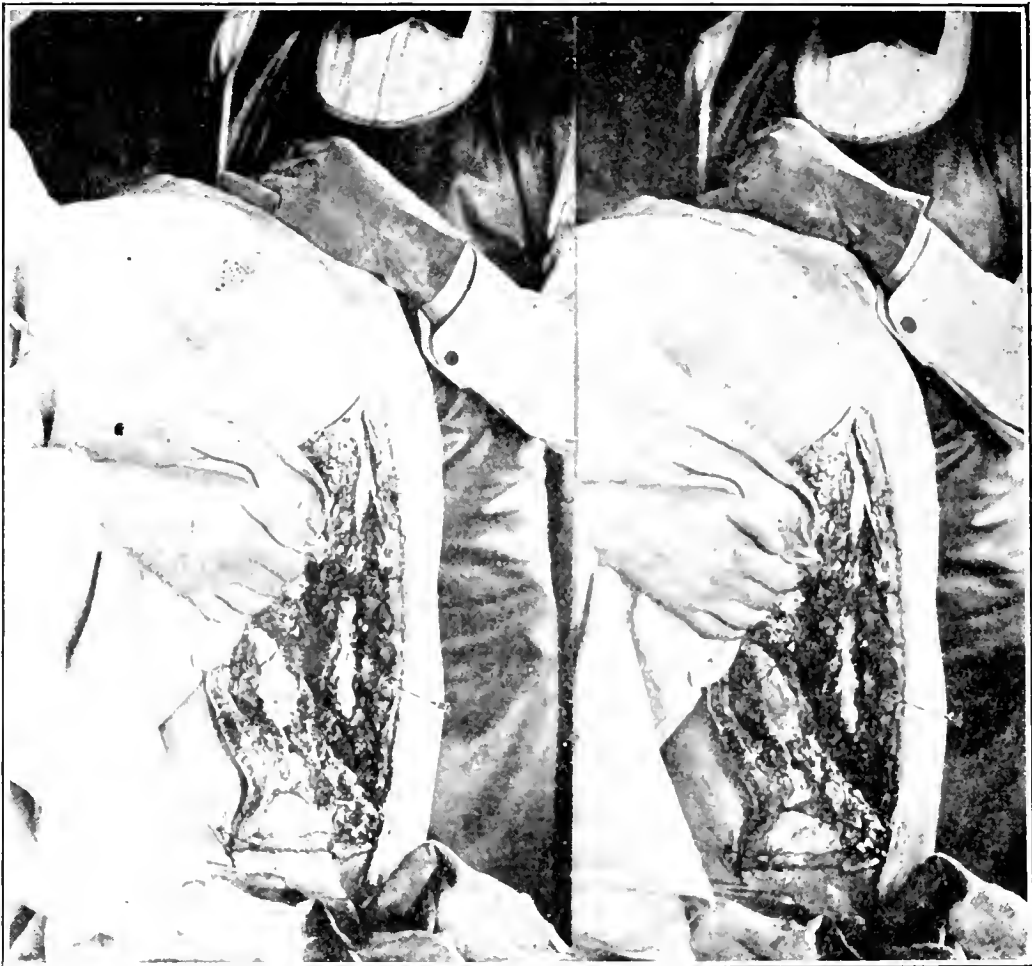


FIG. 1.

FIG. 2.

Summary.—Since the two usual obstacles in the way of the business man who seeks treatment for disease of the spinal nervous system are fear of “puncture headache” and the insistent protection used by the average physician, that of keeping the patient in bed, there is little doubt but that many patients delay indefinitely their treatment and may even reach a stage where actual destruction has taken place with not only a permanent physical disability but many times a partial if not a permanent economic difficulty. It, therefore, occurred frequently in the mind of the writer that it might be possible to utilize the apparently large extra-dural space which contains great amounts of areolar tissue well vascularized and containing many lymphatics. With that in view and also the possibility of inactivated serum passing by the process of dialysis into the spinal fluid system a series of cases were treated by what might be

called the modified (Farnell) intraspinal method,—namely, injection of salvarsanized serum into the extra-dural space whereby a serum can be introduced without the removal of spinal fluid thus avoiding, as very often occurs in early cases, a “puncture headache” and also the unnecessary problem of “going to bed” and at the same time keeping the man at his vocation which is a very important factor in this epoch.

It should be stated that all these patients received a lumbar puncture in order to clearly diagnosticate their condition and with the exception of five all suffered from what has been termed a “puncture headache.” The majority of the ten who had “puncture headaches” spent the greater part of one week in bed, much to their dislike and to the disappointment of their employers. This reinforced, naturally, the feeling of the writer to attempt to treat these patients with salvarsanized serum introduced into the extra-dural space. By this method approximately seventy per cent. improved rapidly so that after from ten to fifteen extra-dural injections they were considered not only free from the symptoms from which they primarily complained but also showed a change in their neuro-physical complex. Three cases that are considered well enough to cease treatment show a negative blood for the Wassermann reaction and a negative spinal fluid for the Wassermann reaction also (these patients again were laid up with a “puncture headache”).

It does seem, therefore, that the extra-dural treatment as here described should be considered as a part of the therapeutic procedure in such cases as do not respond to the intravenous method of treatment. It is also suggested that it might be used as a reinforcement to the intravenous method of treatment because of the fact that it does not interfere with the patient's usefulness to himself and society through his vocation.

I wish to express my appreciation to Dr. A. H. Harrington who made the dissection possible and to Dr. Roland Hammond who X-rayed the spines, with the needle in place, on the living subject.

59 BLACKSTONE BOULEVARD

RECENT EXPERIMENTAL INVESTIGATIONS ON THE ETIOLOGY OF DISSEMINATED SCLEROSIS

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FIRST ATTEMPTS

The first successful attempt to transmit disseminated sclerosis experimentally to animals appears to have been made by W. E. Bullock (now Dr. Gye). The earlier work of Jürgens ('98) is often quoted, though not quite appropriately, by authors who afterwards occupied themselves with the subject of this review. In Jürgens's case large sclerotic foci were observed disseminated in the brain and myocardium of a six-months-old baby, who had been affected for three months by violent convulsive attacks and died in a state of coma. The sclerotic patches were found to be due to the presence of an ameba, similar, according to Jürgens, to the *Glugea Leidigii*. In one out of three rabbits inoculated with the brain material, the same parasitic myocarditis was subsequently observed. The case is interesting because it shows that sclerotic encephalitic foci may be caused by the penetration into the central nervous system of protozoa, but it has very little connection with the etiology of the entity known as disseminated sclerosis.

Bullock's investigations ('13) were made with the cerebrospinal fluid obtained from a patient who exhibited, at the time the fluid was withdrawn, all the classical symptoms of the disease. They are referred to here at some length both because they have pointed the way to subsequent authors, and because they have not been sufficiently considered in most papers and abstracts on the subject. The fluid, withdrawn under rigidly aseptic conditions, was placed in an ice-chamber within five minutes of its withdrawal and kept there for 24 hours. Part of it was then injected into a tame rabbit and a cat. In the case of the rabbit 2 c.c. were injected subcutaneously along the line of the left sciatic nerve, whilst the cat received 2 c.c. intradurally. After the injections the animals were isolated from the laboratory stock. Apart from a slight conjunctivitis the cat remained in perfect health for nine weeks. The rabbit remained in perfect health for twelve days, but on the thirteenth

developed, within twelve hours, complete paralysis of the hind limbs. On the fourteenth the animal was much worse and suffered from incontinence of feces and urine, the urine containing blood, bladder epithelium and a variety of microorganisms. On the sixteenth day the animal was completely paralyzed in all four limbs, and appeared to be dying. It was therefore killed; 6 c.c. of its heart's blood, proved to be sterile by culture tests, was withdrawn and injected into a young Andalusian rabbit which, however, remained in perfect health. The examination of the organs of the killed animal showed, besides a marked cystitis due probably to an ascending infection, interesting alterations of the spinal cord. The whole cord was swollen (probably edematous) and exhibited to the naked eye areas of congestion in the gray matter of the lumbar and cervical regions. Frozen sections, stained with osmic acid, showed fragmentation of the myelin sheath in the white matter of the various regions, together with a swollen appearance of the nerve-cells. Marchi preparations, however, did not exhibit areas of blackened fibers.

The success which had attended the first attempt led Bullock to use the remainder of the fluid, which had stood in the ice-chest for fourteen days, for the inoculation of three more rabbits. It is worth noting that in the meantime the fluid had been tested culturally, but the culture media showed no growth after ten days' incubation. One of the inoculated rabbits had to be killed, having had its left hind leg broken accidentally. The second one remained healthy and alive for nine weeks after the inoculation. The hind limbs of the third became paralyzed on the twenty-first day; the paralysis was more marked on the left side than on the right and was never so severe as in the first experiment; it did not extend to the fore limbs, and in seven days had completely disappeared.

A fresh supply of cerebrospinal fluid from the same case having been obtained, it was divided into two equal portions, one of which was filtered through unglazed porcelain. The unfiltered and filtered lots (1.5 c.c. of each) were injected subcutaneously into two tame rabbits. On the twenty-second day after the inoculation the rabbit which had received the unfiltered fluid became paralyzed in the left hind limb; it recovered completely in four days and remained alive and healthy for 37 days, when it again became slightly paralyzed in the hind limbs; but it again recovered and remained perfectly healthy. The rabbit inoculated with the filtered fluid began to show signs of paralysis of the left hind limb 24 days after the inoculation and locomotion became impossible. From this condi-

tion the rabbit gradually recovered, until six weeks later it could move with a spastic laborious gait. At this period the animal was killed and the histological examination of the cord by Weigert-Pal and Marchi methods revealed great areas of degeneration. The diffuse type and remarkable extension of the degeneration is revealed by three figures illustrating Bullock's paper.

The author makes brief mention of a further series of inoculations made with the cerebrospinal fluid obtained from another patient and injected into four young wild rabbits. It is very difficult to express any opinion about this series, because none of the rabbits employed showed any signs of paralysis, though all died between the tenth and the twenty-sixth day after the inoculation.

In summarizing one can say that in 1913 Bullock had been able to produce paralysis of the limbs in four rabbits out of five by inoculating them subcutaneously with the cerebrospinal fluid withdrawn from a typical case of disseminated sclerosis. The fluid was found to be potent after exposure to a temperature of 0° C. for fourteen days, and after being filtered through unglazed porcelain. In two out of four animals inoculated with positive results, the examinations of the spinal cord revealed alterations similar to those characteristic of the disease in the human subject. One can only regret that the central nervous system of at least the last two animals has not been submitted to a more thorough histological investigation, and that no effort appears to have been made to ascertain the cause of death of the four wild rabbits of the second series of experiments. Interesting lesions might have been found even in the absence of paralytic symptoms in these rabbits as well as in those which recovered from a temporary paralysis of the hind limbs. The figures illustrating Bullock's paper are too diagrammatic, and, as pointed out by Siemerling and Raecke ('14), perhaps not quite convincing, particularly at a time in which the experimental investigation on the etiology of disseminated sclerosis had just begun.

NEW INVESTIGATIONS

The results of Bullock's experiments were confirmed by those of Simons ('18), whose investigations are mentioned here first, because their aim was chiefly that of submitting Bullock's research to control. Simons's experiments were also made with the cerebrospinal fluid of two patients affected by disseminated sclerosis, and who exhibited at the time the fluid was withdrawn signs of a fresh exacerbation of the disease. Three rabbits, injected with the fluid of one of the patients, remained in perfect health, whereas the inocu-

lations made with the fluid of the other patient gave positive results in one animal out of three in each of two sets of experiments. In the first set sterile cerebrospinal fluid, which had been kept for ten days in the ice-chest, was injected into three rabbits. The first one received 0.4 c.c. intracerebrally, the second 0.5 c.c. intradurally, the third 3 c.c. subcutaneously. The last animal began to be slightly paralyzed in the hind limbs nine days after the inoculation; the paralysis became more marked in the following days and extended rapidly to the fore limbs. On the nineteenth day the rabbit seemed to be affected by complete sensory and motor paralysis of the four limbs, ate no more and died. In the second set of experiments sterile cerebrospinal fluid was injected in another three rabbits almost immediately after the withdrawal. Paralysis of the hind limbs made its appearance five days afterwards in the rabbit injected intradurally with 1 c.c. of fluid. The animal did not show any change in the subsequent days and was killed on the fourteenth day. The macroscopic and bacteriological examination of the spinal cord of the two paralytic animals was completely negative. Unluckily Simons was not able to investigate these cords histologically, and we are consequently in complete darkness about the nature and extension of the lesions responsible for the paralysis of both animals and for the death of one of them.

The following points, however, appear particularly interesting: (1) The onset of the paralysis began earlier than in the cases of Bullock. (2) Paralysis of the hind limbs set in five days only after intradural inoculation in the lumbar region. (3) Not all the rabbits were equally receptive, though injected with the same fluid intracerebrally, intradurally, and intraperitoneally. (4) Control experiments made with the cerebrospinal fluid of healthy persons and with Wassermann-positive fluid were attended by completely negative results.

The experiments of Kuhn and Steiner ('17) were much more numerous and of far-reaching importance. Just before the outbreak of the war Steiner had been able to produce in a rabbit marked nervous troubles by intradural injection of cerebrospinal fluid from a typical case of disseminated sclerosis. The rabbit died about six weeks after the inoculation. In March, 1917, he began to carry out further experiments together with Kuhn, the blood and cerebrospinal fluid from acutely developing and clinically certain cases of the disease being used for the inoculations. Guinea pigs, rabbits, mice and one monkey were at first the subjects of the tests, the inoculations being made intradurally, intraperitoneally and intra-

ocularly. In successive sets of experiments guinea pigs and rabbits only were used because they were apparently more suitable for the transmission of the disease. This was obtained with greatest regularity if the inoculations were made intraperitoneally in the case of guinea pigs and intraocularly in the case of rabbits. Blood and mixtures of blood and cerebrospinal fluid, diluted with sterile physiological solution in the proportion of 1:1, 1:3, 1:5, appeared to offer the greatest chances of positive results. In the guinea pigs the disease developed and ended fatally at periods varying from three days to twelve weeks, with symptoms pointing to involvement of the central nervous system. The animals sat humped up and moved about with difficulty, very likely due to a paresis of the hind limbs. Finally their limbs became paralyzed and death ensued generally eight to ten hours after the onset of the paralysis. In other animals the illness set in suddenly after a variable period of apparently good health; but also in these cases it ended frequently and very rapidly in paralysis and death. This happened more often in the case of rabbits, which at first became thin, with dry fur, and appeared to be inert and occasionally sleepy.

It is worth pointing out that Kuhn and Steiner also noticed that rabbits and guinea pigs were unequally receptive to the disease. As in the earlier attempts of Bullock and in the subsequent work of Simons a variable number of animals remained apparently healthy in each set of experiments, while others recovered after a transitory period of slight paralysis. Of great importance is the fact that, out of the material from two different patients, the authors obtained one set of four successful passages through guinea pigs and one set of two through rabbits, the severity of the illness having remained the same after each passage.

At the post-mortem examination of the dead or killed animals Kuhn and Steiner did not find macroscopic changes except congestion of the liver, an observation of importance, as it probably guided them in their further investigations. The authors have not yet been able to work out the histo-pathological changes. Cultures from the blood and from the organs of the animals were one and all sterile. But in films of blood, either withdrawn from the still living paralytic animals or collected from the heart of the dead guinea pigs and rabbits, the authors were able to recognize spirochetes, dark ground illumination, Giemsa's stain and Loeffler's stain for cilia of bacteria being used. Moreover, in four animals inoculated with the material from two different patients, the same spirochetes were found in certain blood vessels and capillaries of the

liver by Levaditi's silver method after a preliminary fixation of the blocks in alcohol and impregnation with 3 per cent. silver nitrate. These spirochetes are described as morphologically very similar to those of Weil's disease, from which they differ, however, being relatively straighter and more regular. By dark ground illumination they appeared very actively motile and provided, at one of their extremities, with a more refracting knob. In particularly successful preparations one of their ends appeared to continue in a small and thin process or cilium.

CONFIRMATORY WORK AND CRITICISM

The important experimental findings of Kuhn and Steiner were bound to excite a considerable amount of attention and confirmatory work on the one hand and criticism on the other rapidly followed. In this respect it is very interesting to note that in the discussion following Steiner's communication on the subject at the Annual Meeting of the Society of German Neurologists (September 28, 1917), Edinger remembered a peculiar observation made by Doinikow in 1913 in two cases of multiple sclerosis. In silver nitrate preparations of the spinal cord (Cajal's method (?)) Doinikow saw a series of blackened knobs apparently united by small threads. This finding could not be confirmed and was never published, but it occurred to Edinger, on hearing Steiner's results, that they might have been altered spirochetes.

No importance could be attached to this causal finding if a far more convincing observation had not been made by Siemerling ('18). In the concluding pages of a long work in which Raecke collaborated, this author had already expressed himself strongly in favor of the opinion that disseminated sclerosis has an infective origin. Successive inoculations of cerebrospinal fluid from human cases into rabbits and two monkeys had been attended, however, by negative results. It was only after having seen one of Steiner's preparations that Siemerling was able to find living spirochetes in the cerebral substance from a clinically certain, though not acute, case of disseminated sclerosis, dead of intercurrent facial erysipelas. The post-mortem examination of the brain, carried out two hours after death, showed a number of focal lesions of varying size, some pinkish in color, other gray, situated both in the superficial cortex and in the deeper substance of the frontal region. Minute pieces from these foci were examined by the dark ground illumination method. In two preparations living spirochetes were found

similar to, if not identical with, those discovered by Kuhn and Steiner. An attempt to stain them in sections did not succeed.

A further confirmation of the findings of the above mentioned authors has been quite recently given by Marinesco ('19). His work, though left incomplete in several respects on account of ill health, had led to valuable results. Experiments were made with the cerebrospinal fluid of two patients who showed all the classical symptoms of multiple sclerosis at an advanced stage of the disease and one of them was still suffering from a severe exacerbation at the time the fluid was withdrawn. Inoculations were made intracerebrally, intraperitoneally and intradurally in six guinea pigs. Three or four days after the injection the two animals, which had been inoculated intracerebrally, began to show motor disturbances of the type already described. In the cerebrospinal fluid withdrawn from the fourth ventricle of these animals a considerable number of living spirochetes were seen by dark ground illumination. These had the characteristics of those described by Kuhn, Steiner and Siemerling. Pettit and Roux, who saw Marinesco's preparations, confirmed this view and agreed that they were probably specific; in any case different from the *Treponema pallidum* of syphilis. It is necessary to add that in later attempts to transmit the virus from the affected guinea pigs to others, and from the same patients to fresh sets of animals Pettit and Marinesco obtained negative results.

The importance of the above observations and experimental research provoked some well-intended criticism on the part of A. Strümpell ('18), his main object being to check too hasty conclusions on the etiology and pathogenesis of disseminated sclerosis. Even admitting, he says, that the disease has an infective origin, we must still ask ourselves how this fact can be reconciled with what has been long known concerning the onset, clinical course and pathology of the disease. First of all, we know nothing about the way and manner of entry of the assumed infection; the fact that the malady may closely follow scarlet fever, influenza, measles and similar infectious diseases, has very little meaning because such a concatenation is not constant and other accompanying conditions, *e.g.*, injuries and intoxications, have been pointed out in this connection. Also the time of the infection is equally unknown and we are uncertain in this respect to which period of the history of patients suffering from disseminated sclerosis we must particularly direct our attention. Besides its sporadic appearance, its tendency not to spread in households and communities, its age and sex incidence, its mode of onset, all tell against the assumption of an in-

fective origin. The few old observations of an appearance of the disease among children of one family are probably to be referred to a quite different form. The clinical manifestations are not as a whole in favor of its infective nature. Strümpell recognizes that it may begin very acutely with a tendency to remissions and to repeated and sometimes very acute exacerbations; and he is willing to admit that these peculiarities are more easily explained by assuming the existence in the diseased body of an infective process. He reminds us, however, that the acute onset and exacerbations with remarkable remissions are features observed in a relatively small number of cases and that the disease follows as a rule a slow progressive course. Nor has it been satisfactorily ascertained that the so-called acute multiple sclerosis (often associated with optic neuritis) can be included, etiologically, in the classical forms of the disease. There are, he says, cases of more or less acutely developing disseminated myelitis, which must be considered as different from the typical disseminated sclerosis clinically, anatomically, and consequently also etiologically.

By assuming that the disease is of an infectious nature we are unable to explain various symptoms such as the transitory phenomena of amaurosis of one or both eyes without any apparent anatomical lesions. It appears equally inexplicable at present how the supposed virus may remain in the body, sometimes for years, without giving any indication of its presence. When once the disease has definitely set in there are generally none of the signs common to other infectious diseases, such as general disturbances, malaise, fever, excess of cells or of protein materials, in the cerebrospinal fluid, though a great number of foci of sclerosis in many cases reach the surface of the spinal cord. Lastly, the pathological changes confined to the central nervous system are not entirely in favor of the infective nature of the disease. It is true that there is much evidence at hand that at the beginning, at least, the alterations have the characteristics of an inflammatory and exudative process originating in and spreading from the blood vessels, but the sharp delimitation of the sclerotic areas, the long conservation in them of the axis cylinders, the absence of shrinkage are at least features not common to other inflammatory processes of the nerve substance.

In spite of all this Strümpell comes to the conclusion that an infective origin of the disease is not unlikely. And he plainly says that all his remarks will lose their value as soon as the spirochetes are more generally found in the affected areas of cases of dissemi-

nated sclerosis and the disease can be regularly transmitted from man to animals. In this way he has himself answered his own criticism, which is referred to here at some length both because it throws much light on the problems which future investigators will have to face, and because one feels bound to agree with him that further confirmatory investigations are necessary before we definitely accept the view that a specific spirochete is the essential cause, the *conditio sine qua non* of all cases of disseminated sclerosis.

SUMMARY

By injecting cerebrospinal fluid and blood, withdrawn under rigidly aseptic conditions from typical cases of disseminated sclerosis, various investigators in different countries have been able to produce in rabbits and guinea pigs a disease of the nervous system ending, after a variable period of incubation, in more or less extended paralysis and death. The inoculations may be intracerebral, intradural, intraperitoneal, intraocular, subcutaneous; but the greatest chances of positive results appear to be offered by intraperitoneal injections into guinea pigs and intraocular injections into rabbits of blood and cerebrospinal fluid withdrawn either from acutely developing cases or from patients passing through a period of exacerbation of the disease. Experiments made with the fluids from one and the same patient may be attended by positive or negative results, if withdrawn at different times. Other laboratory animals, such as cats, mice, monkeys, seem to be less or not at all suitable for the transmission of the disease. All rabbits and guinea pigs are not equally affected by the inoculation, some of them remaining healthy, some recovering from transitory periods of paralysis. There is a certain amount of evidence that the disease caused in this way is further transmissible from animal to animal.

The available results of the histological examination of the spinal cord of affected rabbits permits one to state that the said disease is characterized by lesions similar to those of disseminated sclerosis in man.

An apparently specific spirochete has been found in the positively inoculated animals, viz., in the blood, in the blood-vessels and capillaries of the liver, and in the cerebrospinal fluid. An apparently identical living spirochete has been detected in the brain substances of a case of disseminated sclerosis, the post-mortem examination of which took place two hours after death.

The fact that the inoculation into rabbits of human cerebrospinal fluid kept for fourteen days in the ice-chest and filtered through

unglazed porcelain was still attended by positive results, suggests the idea that the lesions of the central nervous system observed in the diseased animals and possibly also those characteristic of disseminated sclerosis in man, are probably due not only to a living virus, but also to some toxin elaborated by it. More confirmatory evidence is necessary before one can definitely accept the view that disseminated sclerosis is an infectious disease originally and essentially due to the still mysterious penetration in the body of a specific spirochete. At any rate, a splendid field is open to investigations which might lead to results exceeding the most sanguine expectations.

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LONDON,

February, 1920

Translations

THE HISTORY OF THE SYMBOL

BY MAX SCHLESINGER

TRANSLATED BY SMITH ELY JELLIFFE, M.D., AND
LOUISE BRINK, A.B.

(Continued from page 366)

Medical science, especially psychiatry, has given still further a new content to the old word stem. The English neurologists have called morbid ideas of a sexual character "erotic symbolism." In German science Finkelnburg has introduced the name *Asymbolie*, asymbolia, for all forms of disturbed sign formation and disturbed understanding of signs, and thus for the lost ability to make use of symbols. Later authorities have given the word an extended significance, of which something will be said in another connection.

III

In the vulgar Latin and the Greek folk dialects, remnants of which the glossarians⁴⁴ have handed down to us, the word forms have not lost their full sonorous sound even when close to the classic form appear *symbolones*, *simpul*, *simpulum*, nor has the meaning of the word experienced a noteworthy change. Of course altered customs demanded some new formations, for example, *symbolator*; *amicus sponsi, qui cum eo in convivio est assiduus* [friend of the betrothed husband present with him at a banquet].

Both folk dialects preserved thus many words which went over into the Germanic, our *σύμβολον* as well. The Greco-Roman forms are nothing else but evident variants and it is only the change of meaning which furnishes difficulties, yet the further pursuit of the history of the word leads into the thick brambles of etymology. The sign-posts which the great etymological investigators have here set up, such as Diez⁴⁵ and Georg Curtius emphasize the necessity of the greatest foresight in order not "to reach airy consequences," but the temptation is strong "to wrest its secrets from the genius of the lan-

guage. For absolute certainty the etymologist has no guarantee," says Diez. The following discussions are set down only with such reserve and with the most rigid self-examination.

(a)

It may be permitted, with all due honor and most profound respect to Jakob Grimm,⁴⁶ to doubt the correctness of the assertion which he makes in the "Deutschen Grammatik" over the origin of the Old High German word *symbol* (Old Saxon *sumbal*).

Grimm accepts for *symbol* the derivation from the older *simblum* (or *sintblum*). The *m* would be a not infrequent change of the *n* before the labial *b*, the first syllable being accordingly *sin* (*sint*). *Sint* as the third person plural of the verb *sein*, to be, or as the adverb *seit*, since, cannot be thought of. *Sin* might be considered, which Grimm translates in its original sense by *robur*, *vis* [strength, might], and which is employed in adjective form in very many compounds. In investigating the great number there is found, to be sure, a frequently changing meaning in Old High German, in Old Low German *sî*, in Middle High German, in old Schwabian *si*, in Modern High German as characteristic of the superlative of strength, greatness, length, durability. It in no way leads to the goal sought but it might in the compound here needed only signify great, . . . *blum* [bloom, flower] would be a substantive formation, related to the Old High German *polon*, Middle High German *boln*, to throw. According to this *symbol* meant perhaps a great throw.

But how can it be explained according to existing etymology that Grimm himself translates *symbol* and related word formations in three or more places from the Anglo-Saxon, Old Saxon, Old Norse by *convivium* [banquet] or *epulæ* [feast, banquet], a meaning which is also the suitable one in all the places referred to? Yet Grimm states it himself in the Deutschen Grammatik that for the etymological method he lays great stress on the meaning. Here, though, the translation is not covered by the etymology which is given by him. Besides how can *symbol*, which, at least with this meaning, no longer appears at all in Middle High German, be derived from the Middle High German verb *boln*?

Should not this *boln* much rather be carried back to the Greek root βαλ (βελ, βολ), from which Curtius derives it, starting from the Sanskrit root *gal*? He names among the numerous compounds συμβάλλειν and σύμβολον as especially worthy of attention. As to the prefix, we find in Grimm the close relationship, if not the identity,

with the Latin *cum*, pronounced *con*, but first described in complete detail and with convincing force by Aug. Friedr. Pott. He adds besides the Sanskrit word *sam*.

We must also go a step further back than Grimm, for we derive *blum* from the Indo-Germanic root *gal*, and accept for *sym* in place of the averred *sin* the Germanic correspondence of the Sanskrit stem *sam*. In this way we reach the theoretically correct previous stage of our word in the Sanskrit, or with *συν* and *βολ* in Greek. Still the desired meaning of the word is not reached by this means. We first succeed in this if we no longer bring together the Greek root *συν* and *βολ* but when we take over the Greek word in a transferred sense. The neuter *σύμβολον* could not satisfy in this circle of thought, while we naturally find again the meaning in the feminine *συμβολή* as *convivium* [banquet].

According to this we see in the German *symbol* either a further construction from the Sanskrit, for which however proofs are wanting—also an agreement with the customary meaning would not be discoverable—or we conclude, in opposition to Jakob Grimm, that it is a Greek loan word, altered slightly to suit the German tongue and the German ear.

We believe that *συμβολή* used by the Greeks has made this most extraordinary journey into German antiquity, changing itself into *symbol* and into related word formations of similar sound. If this supposition is correct, the claim of Wunderlich and Bahder⁴⁷ is satisfied that we should “press out from the words into cultural history.” Contact at courts, and the clergy and monks must have led the way into the old Norse, the old Saxon, and Anglo-Saxon, or Norman warriors must have brought Greek words home with them, as formerly the Slavs and Arabians had done in conflict or in peaceful intercourse. It may be that we have never found a trace of this way, no reference in the lists of the old roots or of the Greek loan words, nor among the old words which have become obsolete nor elsewhere in the etymological reference books. Yet this is quite easily explained by the fact that the search was made only in regard to the New High German vocabulary, into which the word *symbol* no longer found entrance. On the other hand there is wanting for our word every connection with the past of the German tongue.

Friedrich Kluge says however in his etymological dictionary: “It is exactly the pre-historic periods of the German which furnish the essential foundations for etymological work. First an insight into the difference between the High and Low German consonant system makes it possible to judge of the relationship of a German

word to its Germanic relatives; and the insight into the relation of the Gothic consonant system to that of the Indo-Germanic sister tongues teaches us to understand the comparison of a word with its Greek and Latin related forms." There remains for us thus merely the bringing of negative proof. We may conclude, namely, when we cannot carry a word back to the earlier German history, that it has in fact come as a foreign word from Greece into Germany. In the "Deutschen Rechtsaltertümern" we read from Jakob Grimm: "Symbol, for which, if it were more customary and not inconvenient, we might use the German expression *Wahrzeichen* (sign, token), is in the sense of our ancient law the figurative completion of a business transaction." His grammar gives as the origin of *Wahrzeichen*: Old Saxon *wordtekan* (indicium), Old High German *wortzeihhan*, Middle High German *wortzeichen*; later corrupted to *wârzeichen*, Icelandic to *jarteiken*, Danish *jertegen*. Benecke, Müller and Zarncke hold on the other hand that *Wortzeichen* arises as a corruption of *warzeichen*. As Georg Cohn learned from L. Tobler, this scholar also considered *Wortzeichen* undoubtedly older than *Warzeichen*.

(b)

In the Old Saxon Heliand, the origin of which is attributed to an ecclesiastic of the years 825 to 835, the half verse 3340 reads *sittean at si sumble*, to sit at meat, which Sievers⁴⁹ translates offhand by *speisen*, to eat, Jakob Grimm by *convivium*, Holthausen⁵⁰ in the form *sumbal* by *Gastmahl*, guest feast.

Janssen mentions in Old High German *simblum*, in Old Saxon *simbla* and in Anglo-Saxon *symble* with the translation of *Sünde*, sin, transgression. Might also this change in meaning be referred back to *συμβολή*—perhaps born of a strong religious asceticism, which condemned the revels?

(c)

The Anglo-Saxon, which was spoken by the Germanic inhabitants of England until toward the middle of the eleventh century, frequently has *symbol*, *simbel*, *syml*, in the plural *symbla* with the dative *simblum*. Grimm translates it with *convivium*, *epulæ*, Sievers with *Gelage*, feast laid, Heyne with *Gastmahl*, guest feast, *Schmaus*, feast of good cheer, also in a passage in Beowulf by *gemeinschaftlicher Frass der Seeungeheuer*, common food of the sea monsters, C. W. M. Grein⁵¹ with *compotatio*, drinking together, *convivium* banquet, *cæna*, supper, *epulæ*, feast, *festivitas*, festival, *festum*, festival. The

adverb *simbles*, pertaining to the meal, was in use, also the verb *symblian* or *symblan* signifying to feast, to enjoy oneself. The Anglo-Saxon poems which have come down to us show a great number of compounds with the stem word *symbol*: *sancta-symbol*, all holy, *symbolædg*, holiday, *symbol-gal*, drunk, *symbol-gereorde*, feast, *symbol-gifa*, entertainer, host, *symbol-æcrig*, to overfeed, *symbolæwanc*, *symbolæwonc*, one who makes merry at a feast, *symbol-æynn*, joy in eating, pleasure in feasting.

Grimm's warning must also be given against the confusion with the Anglo-Saxon word *simble* or *simlc*, *symlc*, always. This word is also formed from *simbulum*, *simblum*, and reads later *simbolon*.

(d)

"For six centuries the Anglo-Saxon had held undisputed sway in the plains and hills of England. Then was it hard pressed by the French Norman. Its forms were weakened, its vocabulary diminished."⁵² In Middle English⁵³ as in Middle High German every trace of *symbol* so frequent in the Anglo-Saxon tongue was obliterated (as a feast, banquet, entertainment as well as for a religious festival).

(e)

About the end of the sixteenth century at the latest the word must again have secured footing in England, although in the completely altered sense as emblem, type, for Shakespeare lets Iago speak of "All seals and symbols of redeemed sin." Ludwig's "Deutsch-Englisches Lexicon," "the first of its kind ever made," from the year 1716 gives *symbol* with all the adjective and verbal forms as *Wahrzeichen*, *Kennzeichen*, *Leibspruch*, omen, badge, distinguishing mark, motto. The etymology is deduced by Skeat⁵⁵ from *συμβάλλειν* while he brings the root word *βαλ* into connection with the Greek *βάλανος*, Latin *glans*, acorn, and carries it over again to *baluster*, balustrade. Modern English has given to the word the same meaning as have the other modern languages. Flügel's dictionary adds yet other translations: contribution, toll (of mortality, for example) the fate awarded by the judge (for example on the Last Day). He mentions also the substantive symbolism, the symbolic art and manner of expression. Symbology is the theory of symbolism (*Symbollehre*), science of symbolism (*Symbolkunde*). Characteristically the great Encyclopedia Britannica (1902) explains the word only by creeds, the three confessions of faith.

The English, and in addition to them the French and Italians, have designated the form of logic which we call their algebra, corresponding to the method which makes use of various symbolic signs for the calculations of rational thinking, as respectively *symbolic logic*, *logique symbolique* or *logica simbolica*. The Greek Σ answers for the sign of the sum, Π as the product, the opposing concepts of finiteness and infinity are represented through zero and through a circumflex, etc. In the discussion of signs we will come back again to this use of them for logic.

(f)

The Old Norse, which was spoken from perhaps the ninth century to the fourteenth, borrowed the word according to Bugge from the Anglo-Saxons. Grimm has referred to the manifold agreement of the two dialects. It appears a number of times in the Edda in the form *sumbl* or *sumbli*, also *suml*, with the meaning of convivial drinking, carousal; and with it appear compounds like *sumbl-samr*, revelling, *gumban-sumbl*, a great festive banquet.

(g)

As suddenly as this word had appeared among the Germanic peoples and must have taken a foremost place in their literatures according to their habits of life, even so suddenly was it again lost from their midst. Middle High German, which began with the twelfth century, knows it no more. What circumstances may have obliterated it from the language foundation, what influences driven it from speech usage?

Symbol or *simbel* quite similar in sound and used many times in Middle High German is according to Lexer like Low Saxon *sinwolt*, *senevult*. It means round like a ball and has nothing to do with the *symbol* under discussion here but has arisen from the Old High German *sinwelbi*, literally, completely arched.

IV

The Provençal and French appeared first among the Romance languages which were formed from the language of the Roman people. In them *symbole* early won its right of a home. The word has been carried over extensively into ecclesiastical as well as secular usage, with broadened and newly created meanings.

The course which it has followed has discharged again itself, it is true, into the revived classic word form. It seems, however, ac-

according to many important signs to have followed first a very round-about road. There was also, as far as could be besides this crooked road a straight one, which was kept open by the learned monkish writers. The crooked way, which we must pursue first, leads from the latest spoken Latin (Du Cange) from the word *cymbalum*, in the manner of writing of the Middle Ages *simbalum*, out upon our trail.

The musical instrument *cymbalum* (more frequently *cimbala*) was in use with many people of antiquity and consisted of two metal basins, which were struck together with the flattened hands. A perfected musical instrument, which is to be read differently, was played in the cloisters and abbeys and served for enlivenment at the meal.

The etymological dictionaries of F. R. Diez, Mistral,⁵⁶ Mahn⁵⁷ and others testify to its passage over into the Romance countries. The diminutive *cymbellum* in the meaning of the hand bell which was used to call the monks to their meals leads to the transferred meaning of lure, bait, decoy bird, Italian *simbelle*, Spanish *cimbel*, Provençal and Old French *cembel*. From this use develops the meaning, a coming together for sport, especially for a passage of arms, until this trend of thought ends with the meaning tournament (Old Spanish *cempellar*). The mind swings back again and gives to the word at issue, *simbello*, the secondary meaning of encroachment, haughtiness.

In the "Jahrbuch für romanische und englische Literatur," Liebrecht⁵⁸ refers under the catch word *simbello* (Old Fr. and Provençal *cembel*) to the connection with the old Norse *sumbl*, Anglo-Saxon *simbel* = convivium. And Aug. Scheler⁵⁹ cites without giving his sources, which are difficult to discover, this statement in adherence to Diez. This then leads back to *συμβολή* an opinion which on the face of it would be very tempting to agree with. To-day on the contrary the derivation of *cymbalum* (*symbolum*) already given by Hesychius⁶⁰ from the Greek *κύμβη* (*cavus recessus*, hollow cavity, boat, basin) seems generally to be regarded as the correct one. Georg Curtius and Prellwitz find the word in the Old Indian *kumbha*, pot, pitcher and in Modern High German *Humpen*, beaker.

The Romance languages, however, throw formation and meaning of the words which are to be carried back to both derivations so repeatedly together that, in order to pursue further the changes in meaning, we must likewise disregard the distinctions.

(a)

The Provençal dialect was spoken from the tenth century on in southern France which bordered on Spain. Portugal and Italy, under the name of *lingua romana* or *langue d'oc*, and because of its use in poetry by the troubadours also *langue des Troubadours*. It has the form *cimbol*, *simbol* for the Latin *cymbalum*.⁶¹ Mistral gives us a deep insight into the capacity of change in the word and its use. He draws upon the dialects, beside those mentioned, of Béarn, Bordeaux, Nizza, the Gascogne and the Catalanian. Here again both form and meaning increase in extent. Without distinguishing the idioms we will still name the following variants together with their derivatives: *cimbalo*, *cembalo*, *cimboulo*, *cimbala*, *cimbela*, *cimbour*, *chimbalo*, *cembeus*, *cimbles*, *curbecello*, *simbole*, *simboulo*, *simolle*, *sumbol*, *simbèu*, *simbél*, *sembèl*, *simbell*, *simbleau*, *semèt*, *cimbaletto*, *cimbalié*, *cimboulat*, *cimboulado*. Adjectives and verb forms are associated with these. Some of the meanings attached to these names are: decoy whistle, mule bell, bell of a herd, cowbell, bait, trap, goal, leader of a herd. Yet one combination at the close of this still incomplete diversified series, which however gives in a straightforward way the actual provincial meaning, and this speaks the happy language in its simplicity: *Erbo à cim Boul*, the soft toned love grass, dodder grass.

(b)

In the dialect of northern France (*langue d'oil*, *langue d'oui*), which flourished from the eleventh to the fourteenth century, we meet the forms *simble*, *simbre*, which A. Bos⁶² translates by *pain de pur froment*, pure wheat bread. Here we believe we have at least again stumbled upon the main road which we had formerly left. For in this meaning the word may have passed over the Host which was shared at the Lord's Supper. This, as the symbol of the Lord's body, was baked of unleavened wheat flour in round, thin disks. For this reason it becomes one of the most essential symbols of the entire Christian symbolism, placed on a level with the material from which it was put together. It must not be overlooked that also according to the language of the Church today *le symbole* signifies the sacrament. A. Bos considers the word of the same meaning as *cimble*, *cimbre*, *cemble*, the origin of which he refers back to *cymbalum* and translates it by *pain rond*, round bread. The deep meaning he believes had thus already been forgotten, forgotten that it bore its name from the material, which is always the kernel of its being

and had merely retained the actual round form of the musical instrument.

There is still one short path, first briefly passed over, out of the thicket of the darkness of language into the light of day. The Romans used the word *simila* for fine wheat flour, which we find again in Middle High German as *semel*.⁶³ Luther translates it as *Semmelmehl*, flour for a small loaf. Alois Walde⁶⁴ gives the derivation from Old High German *simila*, *semala* and the connection with the Old Saxon *sumbel*, Icelandic *sumbl*, Anglo-Saxon *sumbel* in the meaning of banquet or fête. The Norse dialects refer the commonly used *semale* with its German translation *Semmel*, small wheaten loaf, back to the old *simle*.

Is not this a perfectly clear finger post pointing to the before mentioned *pain du pur froment*, pure wheat bread, from which the Host was prepared?

(c)

Stephanus formerly found the transition to the French *symboliser*, to symbolize, in the meaning of the symbol as an agreement between man and nature.

The French language of to-day makes a more comprehensive use of *Symbol* than the German. Scheler brings only the always repeated derivation from the Latin *symbolum* and the Greek *συμβάλλειν*.

The article in the "Dictionnaire de l'Académie française" is written by Littré. It is sufficient, therefore, although more often other proofs are selected, to bring forward the various meaning groups into which he has divided the material in his "Dictionnaire de la langue française." These are: (1) Passwords and signs in the mysteries of Cybele and Mithras, (2) emblem, (3) the device side of a medal, but also used for the name of the metal, for the mints and the period of the impression, (4) the holy sacrament (without adding *symboles sacrés*, (5) article of faith, (6) figurative form of expressions in speaking, (7) chemical formulæ.

The "Enzyklopädische Wörterbuch" by Sachs-Villatte furnishes a still more extensive meaning without introducing the excellently chosen citations of Littré. Thus he mentions as a familiar mode of speech the use of the word for "credit with wine merchants." This may be explained perhaps by the fact that along with the bread, the wine is the most important symbol at the Communion and that both of these forms of the sacrament are called *symboles*. The use of the word is brought forward for head and hat, though rare, yet used

by the common folk. The head may surely have been taken over from the language of the mint and the hat might well find its explanation, as in English and Italian, in the inaccurate correlation with the head. Bouchor⁶⁵ published songs under the title "Les Symboles" which praise the religions of antiquity. He bases the name on the fact that religion utters truths which language cannot express distinctly enough, that it is like a veil which allows only a little light to pass through. He designates symbols as devout dreams. The "Grand Dictionnaire universel" has the term *géométrie symbolique* for analytical mathematics.

The substantive adjective form *symbolique*, a memorial monument which commemorates a nation or a deed by means of a visible sign, should be led back to the antique custom mentioned before, for which the masculine *σύμβολος* (*symbolus*) was chosen.

There must still be added for the sake of completeness, as far as this is in general attainable, in addition to the well-known means employed in symbolization, that a certain rule for rhyming of the old French poetry, the rigorous laws of which were created in the fourteenth century, was apparently so named at that time.

The word *symbolisme* was invented in Paris and in the year 1885 taken up in the Café François by a society of young artists and writers, who had up till then called themselves Les Décadents. The poets Verlaine and Moréas strove later for the first rank as having given the name. Whether it was the one or the other, it has seldom happened in the history of a word that one can define so almost exactly the place and year of the birth of a word. The discussion of the idea and the history of symbolism will appear in its proper place.

Misleading as it would be to name the science of symbols *symbology*, the name is equally forbidden through the French designation, which is similar in sound, for the "science of disease nomenclature"—a word with which its medical use must naturally be supplied, since it in general expresses nothing else than the science of symptoms.

(d)

The Italians use the word in the generally employed meanings and also designate by *simbolo* the letters which come to be used in algebra.

(e)

The modern Greeks have kept the old word formations: τὸ σῑμβολον, sign, distinguishing mark, omen, token, image, emblem and

τὸ σύμβολον τῆς πίστεως confession of faith, and the plural τὰ σύμβολα, insignia, ἡ συμβολή, contribution, share, quota, joining together and again in the old Homeric compound δύο ποταμῶν, confluence, point where two rivers flow together; further τὸ σύμβόλαιον compact, contract, agreement, bargain; the attorney is called accordingly συμβολαιογράφος, his office συμβολαιογραφία.

New word formations are those which arise from the west *συμβολισμός* and *συμβολιστής*, symbolism and symbolist.

"The word is the helpful servant of the thought," says Gompertz,⁶⁶ "but a servant, who also carefully preserves the mistakes of his master and loyally guards them." And Jakob Bernays,⁶⁷ in mentioning the etymological trifling and errors of the ancients, commends the correct and promising thought of the Peripatetics, that the history of a word is at the same time a bit of the history of a nation. The remark which Jakob Grimm casually makes and which runs contrary to all his researches is to be rejected: "The understanding and the use of words is least conditioned through a consciousness of their origin. We quietly make use of the idea furnished us in the present at its pinnacle without knowing the foundation out of which it has been created, determined and brought forward."

As one reviews the history of the word symbol, one can confidently agree with the experience of Francis Bacon: "Man believes that his reason governs the word, but it appears also that the word can make its power felt back again upon the understanding."

Goethe's excellent picture, "the original meaning of the word disappears gradually like the image and the superscription of a coin," finds still more explicit illumination in a sentence from his posthumous works: "No word stands still but it always shifts through use from its original place, rather down than up, rather for the worse than the better, into a narrower rather than a wider meaning, and on the ability of a word to change we may recognize the liability to change of the idea."

But the certainty of the prophecy is diminished. It seems to point to exceptions in the valuation of the word. One of these exceptions, which represents not only a falling but also a rising, not only a leveling but an intensifying, not only a decrease in its appearance but also an increase, in short a continual change in the history and the meaning and of the word, is Symbol.

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¹⁰ Of the Roman grammarians only Charisius (400 A.D.) mentions *συμβολή* and then for the bringing together of these words which appear in the Greek tongue as feminine and in the Latin as neuter. In surprising fashion Hch. Keil, the publisher of the grammar of Probus (first century A.D.) conjectures that *cymbroma* among those used only in the plural should perhaps read *symbola*. But we have never elsewhere met the form *symbola* as such a plural.

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Society Proceedings

NEW YORK NEUROLOGICAL SOCIETY

THE THREE HUNDRED AND EIGHTIETH REGULAR MEETING, HELD AT THE ACADEMY OF MEDICINE,

APRIL 6, 1920

The President, DR. WALTER TIMME, in the Chair

PRESENTATION OF CASE OF FAMILIAL DYSTONIA MUSCULORUM OF OPPENHEIM

DR. ISADORE ABRAHAMSON presented three patients in one family with dystonia musculorum of Oppenheim. The progressive stages of the disease were singularly well demonstrated. They were of the pure idiopathic variety, noteworthy especially, first for their definite familial character, second for their resemblance in the deviations from type that are to be met with in all familial diseases, third for a distinct involvement of speech, which Oppenheim denied in his cases, fourth for the involvement of the musculature of the neck not common in these cases, fifth for the varying mental attitude in the three patients, and sixth for the unusual propulsive phenomenon which had not previously been noted in cases of this sort.

The first patient, a young Russian woman of twenty with unimportant family and personal history at the age of twelve experienced difficulty in writing, and became clumsy in her gait. The muscles of her legs would stiffen, this stiffening gradually spread to other muscles and is particularly increased by effort or emotion. While trying to lie quietly her muscles at different localities stiffen up and cause her extreme annoyance. On attempting to grasp an object a coarse tremor appears. Her symptoms have become aggravated during the last three months so that she can neither sit nor walk. During sleep all symptoms disappear. The muscles are hypotonic. There is no paralysis. An abnormal wrinkling of the forehead, and general anxiety is a deviation from the usual Oppenheim manifestations. Speech is dysarthric, bulbar type. The legs are paraplegic, are usually kept crossed, the typical inward rotation of the thigh is clearly apparent, and the feet are turned down. A marked involvement of the neck is of interest, the Adams

apple is prominent, and she shows torticollis. Dystonia, tortipelvis, lordosis, clonic movements of the left hand with tonic movements in legs, and a rhythmical tremor characterize the disease in this patient.

The disease in the second sister, aged eighteen, had an insidious onset. She first noticed difficulty in writing, her muscles began to stiffen involuntarily, the left arm now is drawn up in a flexor spasm, the hand turned outward. She complains that the hip joint on the right will not stay in place, and a drawing feeling above the knee is experienced which produces in her a type of propulsion that is very interesting. Her body is thus bent forward and literally twisted around the vertical axis of the spine. There is inward rotation of the thigh. The gait is bounding. Her condition is much improved when feeling well and rested.

The third member of the family, a boy of fifteen, shows the disease in its early stages. He has the inward rotation of the thigh, the toes point down, the heel is carried high. This condition has been getting slowly worse for the last two years. His first difficulty was with writing also. In walking he swishes his foot, there is a very slight forward bend. He can run well but has difficulty in stopping. Some hand movements can be accomplished such as threading a needle and playing marbles. A fine tremor is noted. Scoliosis and tortipelvis are present.

The three patients show interesting differences in emotional states. The first is extremely anxious, emotional, worried about her condition. The second is optimistic and wants to get well. The boy is apathetic, has no interest in his condition, and in general shows the mental state usually found in such cases, which causes them sometimes to be classed as hysterics.

DR. SMITH ELY JELLIFFE expressed the opinion that it had been a rare opportunity for himself, and also, he thought, for the members of the Society to have presented in so thorough a manner, the developmental history of this interesting syndrome. It was unique to have three members of a family, showing the beginning, middle, and developed phases as had been demonstrated. Dr. Abrahamson had mentioned Ziehen's familial group, which Dr. Jelliffe had had the good fortune to study in Berlin. There were three in that group also, and Schwalbe's monograph had presented the features, but in Ziehen's group the disorder had progressed to a more or less uniform pattern and no developmental study was possible such as the present presentation offered.

Dr. Jelliffe was disposed to emphasize the varying clinical trends of a larger group of striatum syndromes of which these cases were but one of the striking types. It had become increasingly evident that dystonia musculorum, Vogt's double athetosis, Westphal's pseudo-sclerosis, Wilson's lenticular degeneration, Huntington's chorea, tuberous sclerotic idiocy, and even paralysis agitans were to be regarded as but variants in this larger picture of striatum syndromes.

It was recalled that one of Ziehen's patients had come to autopsy and negative findings had been reported, but more recently one of Flatau and Sterling's cases had been autopsied and Thomalla,¹ Schneider,² and v. Economo³ had respectively studied the striatum pathology and the liver, for the case of Flatau and Sterling had afforded a combination of the Ziehen-Oppenheim group of dystonia musculorum types and Wilson's lenticular degeneration types, since the clinical picture was characteristic of the former trend, while the hypertrophic sclerosis of the liver was of the Wilson lenticular degeneration type. The pathological picture of the striatum was one of an abiotrophic atrophy of the cells of the putamen.

The Vogts⁴ and Bielschowsky⁵ had quite recently attempted a synthesis of the various striatum syndromes outlining the pathological trends and enlarging the neurological pictures to be comprised in the group. Thus the Vogts⁶ distinguish, (1) the *Etat Marbé*, which they originally described as double athetosis and in which group many instances of Little's disease are to be included. (2) *Etat dysmyélinique*, or progressive degeneration of the fibers passing between the striatum and pallidum and the thalamus and hypothalamus. These cases are also characterized by athetosis. In one of Jelgersma's cases a paralysis agitans syndrome was present. (3) The *Etat fibreux*, which progresses often as a bilateral progressive chorea without psychical symptoms, also shows in Huntington's chorea. (4) An initially acute, then stationary status fibrosis as a partial expression of cerebral hemiatrophy (Bielschowsky) with a non-progressive athetosis and a minimal paresis of the bodily musculature. (5) Total necrosis of the striatum, chiefly confined to the putamen, and at times reaching to other parts of the globus pallidus. To this group the dystonia case of Thomalla belongs and Wilson's lenticular degeneration. (6) Acute infectious striatum syndromes. Many of these have been observed in our recent encephalitis lethargica epidemic as paralysis-agitans-like cases, athetotic cases, pseudo-bulbar palsies, involuntary laughing and crying cases, etc. (7) Presenile degenerations chiefly of the striatum and pallidum combined with neuroglia proliferations in striatum. Clinically showing as athetosis, paralysis agitans sine agitation, torsion spasm, etc. (8) Status disintegratus with pronounced paralysis-agitans-like symptoms. The striatum was involved either as (a) a general massive atrophy chiefly of the caudatum, of both ganglion cells and fibers, (b) small lacunar softenings or hemorrhages, (c) rarification and absorption processes related to Marie's lacunar softening. It would lead too far to take up Bielschowsky's and Vogt's dis-

¹ Thomalla, Zeitschrift f. d. g. N. u. P., 41, 1918.

² Schneider, Zeitschrift f. d. g. N. u. P.

³ v. Economo, Zeit. f. d. g. N. u. P., 43, 1918, p. 173.

⁴ Vogt, Jour. für Psychol. u. Neurol., 1918, 24, p. 1.

⁵ Bielschowsky, Id., 1918, 24, pp. 20-48.

⁶ Cécile und Oskar Vogt, Zur Kenntnis d. path. Veränderungen des Striatum. . . . Sitzsb. d. Heidelb. Ak. d. Wiss. 1919. [Author's Reprint.]

cussion of the grouping of the various syndromes and Dr. Jelliffe simply referred to these recent studies.

One point of speculative interest concerned the relationships of the striatum to the vegetative control of the muscle metabolism through the liver. Whereas Wilson had argued for a toxin from perverted liver function as causing the striatum changes, Jelliffe would emphasize the neutral integration disturbance of striatum interruption of vegetative liver pathways. Schneider's study offered several interesting points bearing on the possibilities of an analysis of the vegetative integration mechanism which was essential for the liver function, interference with which caused the vagotonic gliosis, and this put the entire muscular metabolic functions to disadvantage, in that the integration of the involuntary part of the muscle structure, the sarcoplasmic substance, and the sensori-motor anisotropic disc parts was seriously impaired. Here was an important field in which future studies could be prosecuted and the vegetative arc components, their spinal pathways and higher integrative synaptic connections laid bare.

DR. TOM A. WILLIAMS, of Washington (by invitation), spoke of the physical components of muscle and the mechanism of muscular tonus.

From the clinical aspect these cases, Dr. Williams felt, did not show true propulsion, since they were able to arrest themselves and turn without difficulty. The attitude assumed by the second patient in walking causes a sort of propulsion. The boy however could go upstairs and walk and run. The peculiarity of gait is a hypotonus rather than a true propulsion. Wherever there was voluntary increased tonus the propulsive phenomena would seem to disappear. In other words the phenomena observed might be termed pseudopropulsion due to dystonia.

DR. ABRAHAMSON in closing the discussion explained that true propulsion or forced movements resulting in propulsion were to be found in lesions affecting the pathways subserving static equilibrium; *i.e.*, the semicircular canals—vestibular nerves, Deiter, Bechterew nuclei, post-longitudinal bundle or interstitial nucleus of the thalamus. Experimental work on this pathway in particular the work of Muskens on the posterior longitudinal bundle proved this. These cases of dystonia show the clinical type of propulsion.

NEUROPSYCHIATRIC SERVICES OF THE U. S. A. GENERAL HOSPITAL NUMBER 1

DR. SYLVESTER R. LEAHY, of Brooklyn, described the opening of the ward for neuropsychiatric patients from overseas and such cases as developed in hospitals under the jurisdiction of the Port of New York. The hospital was opened on November 22, 1918, in the former Messiah Home. It contained five wards, two of which were devoted to the psychoses, one for disturbed patients and one for quiet depressed ones.

The remaining space was allotted to mild mental states, epilepsies, psychoneurotics, constitutional psychopaths. The bed capacity was 220. During the time, nine months and twenty-two days, that the hospital was in operation, 2,550 patients were admitted; 2,126 patients came from overseas and 624 were local cases. Since the hospital was an evacuation unit, urgent conditions only were treated, but its facilities were very complete, and detailed reports and recommendations for treatment were forwarded to each patient's final destination.

Of the total number of cases, 24 per cent. were psychoneurotics, 20 per cent. were of the dementia præcox type, 12 per cent. were of the manic depressive group, 10 per cent. were mental defectives, 5 per cent. were organic nervous disease, principally of the syphilitic type, 4 per cent. were definitely epileptic and 4 per cent. were constitutional psychopaths. Dr. Leahy made a comparison between the group percentages of the hospital with the group percentages of the New York State Hospital service male admissions. Twenty per cent. army and 27 per cent. civilian was the result for dementia præcox, and 12 per cent. army and 9 per cent. civilian for manic depressive psychoses. The dementia præcox was predominant in both groups.

A certain number of psychoses were left ungrouped because of lack of data sufficient to make a differentiation possible. Some of the patients refused to answer questions. They appeared confused and in a dreamlike perplexed state. At times they were very depressed.

DR. SANGER BROWN, II, offered statistics from Savenay France. From this center nearly all the disabled of the A. E. F. were returned to America and it was at this point that neuropsychiatric cases were evacuated. The census of the center was about 10,000 patients, and of this number about 1,000 were in the neuropsychiatric service; in other words, one tenth of the cases. From a survey of all cases in the center made later, it was found that about 12 per cent. of all the injuries involved the central or peripheral nervous system; and it was thought that in the general wards were other cases suffering from neurotic symptoms of sufficient number to bring the total percentage of cases coming under the case of the neuropsychiatrists to about thirty.

Of the cases returned to the United States from the neuropsychiatric service about 30 per cent. were psychoses, 33 per cent. psychoneuroses, 10 per cent. were mental defectives, 8 per cent. epileptics, 10 per cent. psychopaths and 5 per cent. organic cases with mental disease; the remaining 4 per cent. being undetermined types.

The staff was conservative in rendering a positive diagnosis of dementia præcox since the symptoms were acute and the unusual circumstances were taken into consideration. A number of mental conditions were met with, with which the staff was not familiar in civil life—the so-called war psychoses, physical exhaustion, delirium, and fear with disorientation were especially common. A second unusual condi-

tion was the combination of hysterical states such as palsies, contractures or tremors with a psychosis, or with epilepsy or mental defect. Lethargic encephalitis, new at that time, was encountered to a considerable extent, and as no literature was available, these cases were very puzzling when they first began to appear.

ACUTE DESCENDING RADICULITIS—A SPINAL TYPE OF EPIDEMIC ENCEPHALITIS

DR. IRVING H. PARDEE in this paper offered a survey of the literature on the subject, notably in its connection with herpes zoster and syphilis. During the influenza epidemic he had occasion to study a number of cases of radiculitis all of which invaded the cord in a descending fashion, and presented characteristic symptoms of sharp lancinating root pains, paresthesia, muscular spasms, hyperesthesia, delirium, and fever. Several days after the onset of the pains, involuntary muscular spasms appear, causing coarse twitching movements of head, shoulder and neck, like the spasmodic contractions sometimes observed in spinal cord tumors. About a week later when the symptoms have become much less severe a mild delirium usually appears. A confusional state persisting for three or four days is noted, followed by a two-week period of dulness and general apathy.

The clinical course of the disease is peculiar. The symptoms are at first confined to the arm and neck, then progress downward in orderly fashion. Radiating pain is first felt in the upper chest, then girdle sensations around the waist. While the symptoms are at their height in the intercostal and abdominal region there is delirium, but the pain is usually less severe. The symptoms then descend to the legs, the pain increases greatly in intensity. A slight increase in fever precedes the invasion in the lumbo-sacral region, which diminishes again in about four or five days. Thereafter a slow convalescence of many week's duration begins. During this convalescence there is a coarse tremor of the arms and legs.

No other vasomotor, trophic, or sensory changes were to be noted. There was no anesthesia to touch, pain or temperature, no disturbance of deep sensibility, and no herpes. The reflexes were not profoundly altered, though at the onset slight exaggeration of the deep reflexes was noted with a diminution in their activity several days after the invasion in each region. There was no alteration in pupillary reaction, or blurring of vision or oculomotor weakness. Control of the bladder and rectum was retained.

One symptom of interest observed in all the cases was an involuntary flexion of the head. It was not necessary for comfort, and resembled the attitude seen in cervical spinal cord tumor, syringomyelia, and sometimes in amyotrophic lateral sclerosis.

The results of laboratory analysis showed a leucocytosis in the blood—and in the spinal fluid an increase in globulin and a pleocytosis.

Dr. Pardee gave the history of one case that presented all the characteristics outlined. Clinical evidence from this and numerous other cases studied shows that there is frequently an involvement of the posterior spinal roots, appearing either alone or in conjunction with signs of an encephalitis. All Dr. Pardee's patients recovered so other reports had to be resorted to for autopsy findings. Round-cell infiltration in the posterior root ganglia was noted by Strauss and Loewe, and a like involvement with some small hemorrhages and perivascular infiltration by Flexner and Amoss.

In summarizing the points brought out by his study, Dr. Pardee stressed the frequency with which epidemic encephalitis may invade almost any portion of the nervous system. It seems to show a predilection for the basal ganglia, nuclei of cranial nerves, and posterior roots, as evidenced in the cases that he studied. Acute descending radiculitis is an infection of the posterior spinal roots which may appear as a separate clinical entity and pursues a stereotyped course, ending in recovery. It may also antecede in a more or less typical but usually attenuated course, the cerebral form of epidemic encephalitis. If a posterior root syndrome may be considered a prominent complication of epidemic encephalitis, the symptoms illustrated in this paper, myoclonic twitchings, hyperesthesia, and radicular pains, may be considered as much a part of the picture of the disease as diplopia, somnolence, and cranial nerve palsies. The concomitance of radicular pains and influenza offers another suggestion on the obscure etiology of this disease manifestation.

DR. I. ABRAHAMSON in discussing Dr. Pardee's paper said in all of Dr. Pardee's cases we were dealing with epidemic encephalitis [lethargic], a disease bearing only an indirect relationship to influenza. It was a mistake in these cases, to speak of influenzal radiculitis, of descending radiculitis, or of a spinal type of encephalitis. To pick out a part of the clinical picture and to label it a type was not sound teaching. All types of radiculitis were to be found, local, unilateral, ascending, descending, migrating; occasionally or for a time its signs dominated the clinical picture, more frequently it was secondary to other signs and symptoms. He had found radicular signs in at least sixty per cent. of the cases of encephalitis. The commonest sites were the cervical cord, next the mid dorsal and next the lower lumbar region.

The relationship of the radiculitis to myoclonic spasms, to the superficial reflexes and to the skin sensibility was very important. In many cases the similarity of the signs to those of tabes was very striking.

He believed that the Loewe Strauss globoid bodies were responsible for the disease and that within a short time their work would be fully corroborated by others.

A STUDY OF PUBERTAS PRÆCOX AND THEIR MENTALITY

DR. J. H. LEINER reviewed the historical references to cases of pubertas præcox. In this syndrome it would seem that the child passed through several stages of life in utero before it is born. The endocrines seem to be a primary factor in the causation of this condition. Secondary factors are climate, race and heredity. As is well known menstruation appears normally at a somewhat earlier age among women in southern countries, while the inhabitants of the north normally do not begin to menstruate until after 14-16. Marriage in Oriental races takes place very early, and the precocity of the southern races may be due to this inbreeding.

Dr. Leiner described two cases in which there had apparently been direct hereditary transmission. One individual, a girl, at birth gave the impression of a twelve year old child, menstruation began at six weeks and was regular thereafter. A second case, that of a boy, at four years of age looked as though he were at least ten, and had the physical development of a young man of twenty-one. The parents of both of these individuals reported marked virility, or actual instances of pubertas præcox in the parent.

Precocious puberty is caused by a hypersecretion of either the gonads, pineal or cortico-adrenal glands. A secondary involvement of the pituitary and thyroid is also unquestionable. Clinicopathological evidence shows that the first three glands are involved in this syndrome, either in the form of hyperplasia affecting them or neoplasms.

Rogers collected 101 cases of pubertas præcox, eighty-one cases in the female, and twenty in the male; out of the eighty-one cases seventy-three point to the hyperovarian type. A number of other writers have recorded cases of this type, among them Lenz who described the case of a girl in whom menstruation began at sixteen weeks. The secondary sex characteristics were those of a mature woman. As she grew up she became a good scholar, but preferred the society of children of her own age. At twelve she was very shy and childish in behavior.

Lucas reports neoplasm of the ovary as a cause of pubertas præcox. At seven his patient showed all the signs of genito-somatic maturity, with early menses. After removal of a tumor of the ovary, all signs of adolescence, and menstruation disappeared. Eleven cases of sexual precocity associated with ovarian neoplasms were collected by Roger Williams. This does not necessarily indicate that tumors of the ovary lead to sexual precocity, since other factors enter into the causation. The mentality in the ovarian cases never seems to be very great, in fact the patients speak and act their true age. Early menstruation in hyperovarianism produces excess calcium elimination. This results in short stature.

In the cortico-adrenal types of cases the clinical picture differs according to whether the involvement is in the male or the female. Hyperplasia of the adrenals in the male tends to accentuate male precocity; in the female the tendency is to change the female into the male type with all the secondary sexual characteristics of the male. Some fourteen cases of this hypertrichosis of the male type manifested a large clitoris, complete absence of menstruation, and frequently hair on the face. The mentality in these cases is low. A certain degree of aggressiveness is reported.

In cases of hypergonadal condition in the male mentality is usually retarded. In one case of precocious sexuality the removal of a malignant tumor of the testicle caused the disappearance of the adult characteristics.

Tumors of the pineal and their effect upon sexual precocity have been extensively studied. As yet no direct connection seems to have been demonstrated, aside from the statistical fact that pineal tumors occur predominantly in the male while those of the adrenals are most frequent in the female.

There is little or no real mental precocity in all these types, the patients are usually shy and reserved on account of their appreciation of their differences from the normal type. Early diagnosis in the hyperplastic types may result in improvement by proper endocrine therapy.

DR. WILLIAMS expressed his appreciation of the useful synthesis presented in Dr. Leiner's paper.

DR. WALTER TIMME added that two cases, as yet not published had come to his attention. They were both in the same family. One of the two girls was then sixteen, had begun menstruating at five and had developed a psychosis of the dementia præcox type. The younger sister was three years old, menstruation had begun before two, the child was of the incorrigible type, and was apparently advanced in intelligence. Both showed pineal shadows, which are to be observed with extreme rarity at these ages. The locus of the disturbance was probably in the pineal.

With reference to Dr. Leiner's comment on the relation between skeletal growth and menstruation, Dr. Timme knew of cases that would controvert the fact that late menstruation was accompanied by increased height. In a case that he knew although menstruation began after seventeen, the individual remained small, and the epiphyses were ununited. The patient was treated on the basis of retarded growth; endocrine therapy produced very rapid growth.

CHICAGO NEUROLOGICAL AND CHICAGO PATHOLOGICAL SOCIETIES

JOINT MEETING, APRIL 14, 1919

HUGH T. PATRICK, M.D., in the Chair

TRANSPLANTATION OF PERIPHERAL NERVES

PROF. G. CARL HUBER reported at length a series of experiments upon nerve transplantation in order to discover whether this was a suitable method for obviating the defects which interfere in nerve surgery with bringing the ends together in simple suture. He describes his methods which were those of modern aseptic surgery and allowed of union by primary intention.

He states that regeneration of the degenerated portion of a peripheral nerve takes place through a downgrowth of new neuraxes from the undegenerated part.

He made first some experiments with injection of absolute alcohol in which he proved that such injection prevents the formation of amputation neuroma which otherwise tend to form. Injection of absolute alcohol or of acetone into a living nerve without section causes fragmentation and in time downgrowth of central neuraxes and therefore is worthy of consideration in severe causalgia.

The disadvantage which surgeons find in bridging a larger nerve with the smaller cutaneous nerve best chosen for such an operation was found to be obviated by using several segments of the smaller nerve. Huber found that in a few days an epineural sheath forms around these and then downgrowing neuraxes penetrate them, passing through the several funiculi and reaching the distal segment. The results justify the tedium of the process, the making of a second wound and repay the care with which the process is carried through. This was found in the case of auto-nerve transplants or transplants from the same individual. Good results were also obtained in homo-nerve transplants or those from an individual of the same species. In hetero-nerve transplants or those from individuals of another species it was found that neurotization of the distal segment stump is possible but the results are not so certain nor favorable as in the other cases nor so complete and the experimentator does not recommend it for surgery.

He also tested the comparative value of using fresh nerve tissue, or nerves already degenerated before transplantation. Though the experiments were not too few to be absolutely conclusive it seemed to be true that the regeneration of the distal stump of the cut nerve was not any better or more quickly accomplished if the necessary degenera-

tion of the transplanted portion had taken place beforehand. This was the case with the auto-nerve transplant and positive results were also obtained in the case of homo-nerve transplants. The use of degenerated homo-nerve transplants in surgery made it of interest to test the storing of these, as for example from amputated limbs, until they were needed. Huber quotes an experiment of this type from the French literature, the use of such transplants stored in petrolatum. Very gratifying results were obtained with transplants removed aseptically and stored as these French writers described. Other experiments not yet conclusively finished were made with fifty per cent. alcohol, also reported from France, with apparently similar successful results. Experiments not yet finished were reported with hetero-nerve transplants stored thus.

Experiments were also made in regard to the value of certain sheaths used in surgery to wrap about nerve transplants or suture lines. Untreated Cargile membrane was absorbed before it could prevent the formation of connective tissue in the vicinity of the areas in question and therefore threw doubt upon its surgical value. Alcoholized the membrane remained around the transplant or suture line for seven weeks and justified its presence by the absence of increased connective tissue about the areas.

The use of auto-fascial sheath with auto-nerve transplants showed a long continuance of the sheath, but the growth of connective tissue had not been prevented. Formalized arterial sheath continues in place for a long time without increase of connective tissue. Only insufficient experiment was made with completely detached auto-fat sheath but its replacement by dense fibrous tissue argues against its usefulness. Tubular suture with use of formalinized artery was tested but found to possess no advantages over other methods of bridging nerve defects. Negative results were obtained with direct suture of nerves under tension.

LIEUT.-COL. DEAN D. LEWIS commented on the end-to-end suture as the ideal nerve repair and believed from his war experience that primary suture should take place early in all peripheral nerve surgery. Care must be taken to get neurofibrilla in conjunction with neurofibrilla, which require considerable approximation and injury to the nerve, as the wounds are extensive. This will necessitate flexion of the elbow or of the knee in injury of the musculospiral or in the sciatic. Beside primary end-to-end suture there should also be considered linear section and auto-neurolysis to permit expansion of the nerve so that the axons may grow through; also the possible dissection off of scar tissue; and the use of an auto-transplant. After-treatment must be kept in mind as an important thing.

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Binet, L. THE OCULOCARDIAC REFLEX. [Presse Méd., Aug. 28, 1919. J. A. M. A.]

Binet asserts that compression of the eyeball modifies not only the heart but also respiratory and motor functioning so that besides the oculocardiac there are oculo-respiratory and oculomotor reactions. Among the practical applications of this method of research, he suggests having it used during auscultation of the heart in dubious cases. With an extracardiac murmur there is generally tachycardia. On compression of the eye the heart beat drops from 100 to 60 or 40, and the murmurs disappear, while an organic murmur becomes stronger and more distinct on compression of the eye. Compression of the eyeball may arrest a spasm of paroxysmal tachycardia. Its action on the vasoconstrictors is evident even in the brain; the headache after trephining becomes transiently reduced as the eyeballs are compressed. This may likewise arrest for half a minute respiration in inspiration, or it may slow the respiration, reducing the rhythm but increasing the amplitude. This explains the favorable action on asthma and on hiccup. The inhibiting effect on hiccup is particularly distinct, and Binet commends it for current practice. The oculomotor reflex is particularly pronounced in the shaking with a chill, as compression of the eyeball arrests the muscular contractions. Dulac's recent Paris thesis was devoted to the biologic effects and therapeutic action of compression of the eyeballs. Binet gives the tracings from a case of exophthalmic goiter showing the marked effect on the tremor of compression of the eyeballs. The tremor nearly stopped completely, and it did not resume its original amplitude for some time. In a case of athetosis, likewise, the inhibiting influence of compression of the eyes was marked, and Voisin has recently called attention anew to the arrest by it of neuro-pathic epileptiform seizures. Bailliart has applied the method further to determine the arterial pressure in the branches of the central artery of the retina, as Binet describes.

Atwater, Reginald M. SCLERODERMA AND SCLERODACTYLY. [American Journal of the Medical Sciences, July, 1919.]

The case described is that of a Jewish woman with well-marked scleroderma of one year's standing, not unlike the general group of

diffuse sclerodermas, but the report is somewhat unusual in recording Roentgen studies of the bones, metabolism determinations, studies of skin sensation and histologic examination of the involved skin. The patient's family history was suggestive of a case in a sister. The onset of the thickening in each new area in this case was preceded by an itching, papular eruption lasting several days. The physical examination showed marked hardening of the skin associated with brown pigmentation and a glazing of the surface most marked over the face, neck, wrists, ankles and in the small of the back. The hands showed moderate general swelling of the fingers as contrasted to the upper part of the hand along with atrophy of the interossei. The ends of the fingers appeared thickened and shortened, much as if they had been chopped off. All of the finger-tips had a thinning of the skin into a parchment-like membrane, associated with some scarring and a marked pallor of the tips as contrasted with the adjacent skin. The fingers could be only partly flexed, evidently due to the thickening of the skin and not to any change in the joints. Thermal sense was not disturbed over any portion of the body. The patient had quite a marked anemia. The Wassermann reaction on the blood serum was negative. Roentgen studies of the hands showed definite bone atrophy and absence of the tips of the terminal phalanges of all fingers and partial destruction of the corresponding bone in the thumbs. Studies of the other bones were negative. The basal metabolism showed normal findings. Histological study of a piece of skin removed from a sclerosed area showed a considerably increased thickness of the corium with dense and hyaline collagen in the connective tissue. The epidermis was of normal thickness and contained in the basal layer more than the ordinary amount of pigment. The glands, hair follicles and fat were normal. The small arteries, veins and nerves in the specimen all showed a normal histology. A summary of literature bearing on cases of scleroderma where the sclerodactyly was mentioned as a feature is included in the article. Apparently quite a number of cases of diffuse scleroderma show very similar changes in the bones of the hands as are recorded here. There is a characteristic atrophy, absorption and eventual disappearance of the terminal phalanges most commonly in the hands but sometimes also in the feet. [Author's abstract.]

Vampri, E. PHYSIOPATHIC PARALYSIS. [Annaes Paulistas de Med. e Cirurgia, S. Paulo, Brazil, July, 1919, J. A. M. A.]

This patient was shot through the chest. He developed paralysis of the upper extremities with vasomotor and trophic lesions in the left hand and arm. The contrast between the localization of the wound in the chest and the diffusion, and the ascending course of the paralytic and trophic disturbances in the arm are special features, as also their tenacious course refractory to intensive and protracted treatment all of which point to an implication of the vegetative nervous system.

Pastine, C. FAMILIAL PERIODIC PARALYSIS WITH ACETONURIA. [Riv. di patol. nerv., 1918, 23, 224-32.]

There is here a record in a man aged 37, who was diagnosed periodical hysterical paralysis. A vague sense of general weakness or of weakness in the lower limbs with slightly painful sensations in the calves were premonitory symptoms of the attacks. In twelve to twenty-four hours complete motor palsy developed, involving the upper limbs, trunk, lower limbs, and part of the neck muscles. The muscles of mastication were more or less weakened as well as those of the pharynx, and occasionally those of articulation. The paralysis would be complete for a day or two, then to subside, return for half or a whole day, and then disappear. While the paralysis persisted the tendon reflexes were abolished, and the cutaneous reflexes were also lost or only feebly present. Superficial sensibility, and deep, was preserved. Electrical excitability was diminished, but not abolished. The return of movements might begin both in the upper and lower limbs, either on one side or on the other, and not always in the inverse order to that in which it had set in. The urine contained acetone during the onset and height of the disease. This disappeared as the paralysis subsided, being replaced by acid sodium urate. No other member of the family was affected.

Pastine, C. FAMILIAL PERIODIC PARALYSIS (ACETONE IN THE SWEAT AND URINE DURING THE ATTACKS). [Riv. di patol. nerv., 23, 1918, 65-73. Med. Abst.]

This disease was first described by the Russian physician Schachnowitz in 1882, and more in detail by Westphal in 1885. Only about 80-90 cases are on record. It has been chiefly observed in Russia and Germany, and is most exceptional in Italy. Pastine records a case in a soldier aged 30. His father, an aunt, and two paternal uncles, his two brothers, a sister, and most of their children were similarly affected. His mother was immune. The paralytic attacks began at the age of 4 or 5 years. At first the lower limbs only were affected, and the attacks were of short duration and infrequent. Subsequently they became more extensive, of longer duration, and more frequent. Severe attacks which lasted about a week were followed by milder attacks lasting from a few hours to two days. The severe attacks began with a feeling of fatigue or weakness in the lower limbs; in two or three days the weakness became a more or less complete paralysis affecting not only the lower limbs but also the trunk, upper limbs, and in part the muscles of the neck and face, tongue and pharynx, and was accompanied by profuse sweating. The tendon reflexes were not abolished, but considerably diminished. The muscles showed reduction of galvanic and faradic excitability. The paralysis was most marked in the night and in the morning. In a few days it began to diminish from above downwards,

the sweating entirely ceased, and the patient resumed his normal state. In the mild attacks the lower limbs and trunk were chiefly affected, the muscles of the head escaped, and there was no sweating. The sweat and urine during the attacks contained acetone, which disappeared as the paralysis subsided and was replaced by an abundant sediment of earthy phosphates.

Higier, H. ATROPHIC MYOTONIA AND MYOKYMIA AND THEIR CLINICAL AND PATHOLOGICAL STATUS IN RESPECT TO THOMSEN'S DISEASE AND TETANY. [Zt. f. ges. Neur. u. Psychiatrie, 1916, Bd. 32, H. 2/3.]

A consideration of two cases of atrophic myotonia and atrophic myokymia leads to the following conclusions:

(a) Pure myotonia is endogenous, congenital, familial, the body musculature is affected, it is ubiquitous and incurable.

(b) Atrophic myotonia or myotonic dystrophia is a special, strongly characterized, malignant, rare type of Thomsen's disease, connected with a pathognostic localization of muscular dystrophy (Steinert) which runs a course with other severe phenomena of abiotrophic character (Curschmann). (Loss of hair, genital hypoplasia, premature cataract, failure of reflexes with tabiform degeneration.)

(c) Acquired myotonia is not congenital, is not associated with any particular age, is not a familial disease, is unilocular, has a good prognosis and may usually be summarized as a myotonoid syndrome with other illnesses [f. e., in Epilepsy, Syringomelia, Tetany, Paralysis agitans, etc.]. The writer had two cases of acquired myotonia accompanied by bilateral neuritis ischiadica.

There are various ways of distinguishing the myotonic from the myotonoid contractions, both in the realm of voluntary and resistance motions, and in that of mechanical and electrical irritability. The external similarity apparently depends upon an inner essential connection.

In addition to pure idiopathic tetany as an independent nosological form, there is also a tetanoid syndrome (with neurotonic reaction stiffness of the muscles, increase in mechanical irritability in the muscles and nerves and formation of cataract usually occurring in the course of other diseases [neuritis, neuromyositis, atrophic myotonia]). The tetanoid symptom complex is not general, is sharply localized in the diseased nerve muscle formation, and progresses or disappears with the basic malady.

The myotonoid and tetanoid phenomena which are so numerous, so severe and so persistent appear as the true myotonic and tetanic phenomena in Thomsen's disease and in spasmophilia.

Pure myokymia and atrophic myokymia are, as opposed to pure myotonia and pure tetany, never and nowhere units of disease, but are syndromes, expressing an acute or subacute condition of irritability in the muscles. It consists of muscles waves, muscles flickers and

muscular twitchings, is exogenous, acquired, usually strongly localized and is usually developed in connection with a pronounced or rudimentary neuritis or neuromyositis (in over-exertion, trauma, infection, compressive degeneration of the nerve roots) more rarely from a chronic ailment. This is always lacking in pure myotonia and tetany. Simultaneously with the fasciculo fibrillary muscle waves, in myokymia, in the motor and trophic realm, there arise many phenomena of irritation (myotonoid after-effect, true muscle hypertrophy, muscle tension, cramp, mechanical and electrical after phenomena) which have a superficial resemblance to myotonia, but do not resemble it in essentials.

It may be possible to include, with Bittorff, myokymia (Schultze), neurotonia (Remak), and acquired myotonia (Talma) in the common group of "peripheral muscle cramp," but they cannot all be placed in the myocardia group. Only the Thomsen-like myotonoid contractions in voluntary or resistance motions, with mechanical and electrical stimulus, with muscle and nerve irritation, but not myokymic muscle-flicker, are characteristic of peripheral muscle cramp in the Bittorff sense.

No functional myokymia may be designated as an innate degeneration anomaly, especially where the myokomia is locally restricted (Piermann, Oppenheim cases) and connected with bilateral loss of visual reflexes.

1. **Jordan, H. E.** 1911. THE STRUCTURE OF THE HEART MUSCLE OF THE HUMMING BIRD, WITH SPECIAL REFERENCE TO THE INTERCALATED DISCS. [Anat. Rec., Vol. 5, pp. 517-529.]
2. 1912. THE INTERCALATED DISCS OF HYPERTROPHIED HEART MUSCLE. [Anat. Rec., Vol. 6, pp. 357-362.]
3. 1912. THE INTERCALATED DISCS OF ATROPHIED HEART MUSCLE. [Proc. Soc. Exp. Biol. and Med., Vol. 10, pp. 1-3.]
4. 1914. THE MICROSCOPIC STRUCTURE OF MAMMALIAN CARDIAC MUSCLE, WITH SPECIAL REFERENCE TO SO-CALLED MUSCLE CELLS. [Anat. Rec., Vol. 8, pp. 423-430.]
5. 1916. A COMPARATIVE MICROSCOPIC STUDY OF CARDIAC AND SKELETAL MUSCLE OF LIMULUS. [Anat. Rec., Vol. 10, pp. 210-213. (Proc. Am. Assoc. Anat., 1915).]
6. 1916. THE MICROSCOPIC STRUCTURE OF THE LEG MUSCLE OF THE SEA-SPIDER, ANOPLDACTYLUS LENTUS. [Anat. Rec., Vol. 10, pp. 493-508.]
7. 1917. THE MICROSCOPIC STRUCTURE OF STRIPED MUSCLES IN LIMULUS. [Pub. 251, Carnegie Institution of Washington, pp. 273-290.]
8. 1917. STUDIES IN STRIPED MUSCLE STRUCTURE, III. THE COMPARATIVE HISTOLOGY OF CARDIAC AND SKELETAL MUSCLE OF SCORPION. [Anat. Rec., Vol. 6, pp. 1-20.]

9. 1919. STUDIES ON STRIPED MUSCLE STRUCTURE. IV. INTERCALATED DISCS IN VOLUNTARY STRIPED MUSCLE. [Anat. Rec., Vol. 16, p. 205.]
10. 1919. STUDIES ON STRIPED MUSCLE STRUCTURE. V. THE COMPARATIVE HISTOLOGY OF THE LEG AND WING MUSCLE OF THE MANTIS, WITH SPECIAL REFERENCE TO THE N-DISC AND THE SARCOMERES. [Am. Jour. Anat., Vol. 16, p. 217.]
11. **Jordan, H. E., and Banks, J. B.** 1917. A STUDY OF THE INTERCALATED DISCS OF THE HEART OF THE BEEF. [Am. Jour. Anat., Vol. 22, p. 285.]
12. **Jordan, H. E., and Bardin, J.** 1913. THE RELATION OF THE INTERCALATED DISCS TO THE SO-CALLED SEGMENTATION AND FRAGMENTATION OF HEART MUSCLE. [Anat. Anz., Bd. 43, pp. 612-617.]
13. **Jordan, H. E., and Steele, K. B.** 1912. A COMPARATIVE MICROSCOPIC STUDY OF THE INTERCALATED DISCS OF VERTEBRATE HEART MUSCLE. [Am. Jour. Anat., Vol. 13, pp. 151-173.]

Beginning with a study of the intercalated discs in the heart of the humming-bird, in 1911, H. E. Jordan has contributed a series of thirteen papers on the minute structure of striped muscle, with special reference to the histologic basis of contraction, and to the relation between the contraction band and the intercalated disc. Already in his first paper (1) he presented strong evidence against the several earlier, and perennially recurring, hypotheses concerning these discs, that they represent: (a) intercellular cement lines (Schweigger-Seidel, et al.); (b) developing sarcomeres (Heidenhain); (c) tendinous structures (Marceau, et al.). Throughout this series of papers evidence accumulates that vertebrate heart muscle is not correctly interpreted as definitively cellular, but that it is in fact a syncytium. He develops the hypothesis that the intercalated discs represent essentially "modified irreversible contraction bands." This hypothesis was at first based largely on Rollet's description of the formation of the contraction band. In his more recent papers Jordan has undertaken to present new evidence in support of Rollet's original conception; and in refutation of the criticism, especially by Schaefer, that the contraction band, as the expression of a genuine reversal of striation during contraction, is an optical illusion.

Prior to the work of Jordan and Steele (13) the teaching prevailed that intercalated discs do not occur in the hearts of forms below birds, nor in mammalian hearts until some time after birth. These investigators demonstrated the presence of typical intercalated discs in one or several representatives of each animal group to, and including, teleost fishes. Jordan subsequently observed their occurrence also in the heart of the horseshoe crab (5 and 7). It was shown further that these discs make their appearance in the heart of the guinea pig late in the

gestation period (13). More recently Jordan and Banks (11) have shown that the discs first appear in the heart of the beef towards the end of the second fetal month, about the time that the originally discrete fusiform muscle cells unite to form the definitive syncytial myocardium.

A fact of cardinal interest concerns the parallelism between the phylogenetic and ontogenetic history of these discs. In the lower groups of vertebrates, as in the earlier fetal stages in mammals, the discs are exclusively of the simple band type; in birds, as in the later fetal stages in mammals, step forms occur; in the adult mammalian heart still more complex types occur (*e. g.*, serrated forms) (13). Hypertrophied hearts are characterized by a complicated serrated type (2); atrophied hearts largely by a compact band type (3). In such abnormal hearts the discs appear to present levels of greater weakness along which the myocardium readily fractures (12).

A contraction band consists principally of the opposite halves of two successive dark discs (of the relaxed fiber) fused about a telophragma (ground- or Z-membrane) (6). It represents a genuine reversal of striation as regards the deeply staining constituent of the stratified sarcoplasm (10). The simplest type of intercalated disc appears histologically identical with a contraction band. We need only postulate that under certain conditions a contraction band becomes incapable of reversal, in whole or in part, in order to derive the several varieties of the simplest type of disc. Such become subsequently more or less modified by the accumulation of tissue fluid among the elements of the disc; the ground membrane, which connects peripherally with the sarcolemma, providing a ready pathway for the penetration of the inter-fiber tissue fluid. The several more complex types are readily derived from the simple type through the operation of mechanical factors, such as obviously prevail in the syncytial cardiac musculature during function.

This is the basis of Jordan's new hypothesis regarding the intercalated discs, with which all of the pertinent histologic data are in strict accord, namely, that they are essentially modified irreversible contraction bands. If this hypothesis is correct we should expect to find, under certain conditions, similar intercalated discs also in skeletal muscle. Jordan now reports, and illustrates, such discs in a specimen of human leg muscles (9); and he adds, in the same paper, new evidence in support of the interpretation of the contraction band as a transient accumulation of the deeply staining substance of the sarcoplasm about the telophragma during contraction. [Author's abstract.]

2. ENDOCRINOLOGY.

McCarrison, R. EFFECT OF A SCORBUTIC DIET ON THE ADRENAL GLANDS. [British Medical Journal, August 16, 1919.]

McCarrison in pursuing his investigations in the rôle of the vitamins has studied the effects of a scorbutic diet on the adrenal glands in guinea pigs and found that in pigs dying in consequence of such a diet the glands were approximately twice as heavy as in the normal animal. The difference was even more marked when the weights were compared on the basis of the original and final weights of the animals. In spite of the great increase in weight of the glands the amount of epinephrine present in them was only about half that in the glands of normal animals. In addition to these changes the histopathological changes included hemorrhagic infiltration and disintegration of the cellular elements of both cortex and medulla. The latter changes occurred in animals which did not show any clinical evidences of scurvy, and were regarded as being prescorbutic in character. In contrast to these findings were those in pigeons fed on diets free from all accessory food factors. Such birds showed an increase in the epinephrine content of the glands. The evidence so far available, however, in both birds and mammals indicated that the functional perfection of the adrenal glands depends on the provision in the diet of adequate amounts of all of the accessory food factors.

Fonseca, J. M. ASTHENIA AND SUPRARENALS. [Arch. Brasil de Med., Vol. 9, No. 3.]

This article presents an argument with clinical evidence to support it that muscular weakness is frequently due to insufficiency of the suprarenal medulla and entire chromaffine system, and secondarily to disturbance of the suprarenal cortex.

Stewart, G. M., and Rogoo, J. M. ACTION OF STRYCHNINE UPON THE OUTPUT OF EPINEPHRINE FROM THE ADRENALS. [Journal of Pharmacology and Experimental Therapeutics, May, 1919.]

The experimenters found that strychnine caused a marked increase in the output of epinephrine from the adrenals in the cat and dog. Ten times the original amount were observed. The increase persisted for a considerable time. When the last adrenal sample was taken, usually an hour to an hour and a half after the strychnine injection, the epinephrine output remained notably augmented. With the smaller doses the output was sometimes greater at this time. Doses of strychnine well within the therapeutic range, which caused little or no exaggeration of reflex excitability, produced a considerable increase in the output. The animals being well anesthetized, it is supposed that still smaller doses would suffice in nonanesthetized animals. Indications were obtained in some experiments that the stage of prolonged in-

crease of the output, which constitutes the principal action of the drug, may be preceded by a transient diminution; this was best seen with the smaller doses and upon subcutaneous administration. No evidence was found that under strychnine the possible normal maximum concentration of epinephrine in the plasma—something like one in 500,000—can be increased. In spite of the greatly increased output caused by strychnine, there was no evidence that the epinephrine store of the adrenals is distinctly diminished even by the prolonged action of the drug in large and repeated doses. The accumulation of epinephrine in the glands is therefore increased as well as its liberation. This is what occurs during stimulation of the splanchnic nerve, except when intermittent stimulation is continued for very long periods. It corroborates other evidence that the strychnine effect is produced by an intensification of the secretory process through the nervous mechanism which normally governs it, and not by a direct action on the adrenals.

Destefano, J. DYSTROPHIA ADIPOSEGENITALES IN AN ADULT. [*Semana Medica*, 26, 1919, No. 1.]

An inadequately treated attack of cerebral syphilis fourteen years before had modified the pituitary body of this 50-year-old man so that symptoms of perverted functioning became apparent. Obesity developed, with loss of genital functions, loss of all the hair on body and limbs, except at the pubis and axillae, and the urine finally showed up to 15.94 gm. of sugar. The pituitary body on X-ray was smaller than usual.

Tucker, B. R. PITUITARY IN EPILEPSY. [*Am. Arch. Neur. and Psych.*, Vol. 2, No. 2.]

The author brings out the thesis that hypopituitary activity and the group of convulsive phenomena usually termed epilepsy are related. This group he divides into a chronic hypopituitary type and a periodic or transitory hypopituitary type. Pituitary gland feeding has a beneficial effect he has found.

Alvarez, A. C. FROEHLICH'S SYNDROME. [*Siglo Med.*, Aug. 30, 1919.]

In the patient the roentgenogram of the hand, eunuchoid voice, rounded outlines, subnormal temperature, shape of breasts and abdomen, and the atrophy of the genital organs in a young man, accompanied by atrophy of the optic nerve, headache, and slight bulging of some segment of the arm or leg, all pointed to an evident hypophyseal tumor with the adiposogenital syndrome with pressure in the optic tracts.

Roberts, S. R. HYPOPITUITARISM. [*So. Med. Assoc., J. A. M. A.*, Dec. 6, 1919.]

Undergrowth, dwarfism, dysgenitalism, feminine hirsuties, feminine type skeleton, lack of secondary sexual characteristics, genital atrophy

and impotence, headaches, languor and weakness may appear in varying degrees in different cases at different periods. The classic signs and symptoms of hypopituitarism are subnormal temperature, dry skin, adiposity, low blood pressure, slow pulse, constipation, amenorrhea, drowsiness and inactivity. Lack of attention, impairment of memory, actual dullness, and mild psychoses to actual convulsive seizures with epileptic attacks may occur. The cause may be glandular deficiency of one or both lobes, a pituitary tumor with damage of the gland, or a neighborhood tumor or hydrocephalus with pituitary pressure. The symptoms of intracranial tumor may be more prominent than those of pituitary deficiency. Infantilism, dysgenitalism and obesity, symptoms of intracranial tumor, warrant pituitary study.

Lereboullet et Hutinel. PITUITARISM. [Bul. méd., August 2, 1919.]

These observers showed two adults at a meeting of the Société Médicale des Hopitaux, with the adiposo-genital syndrome of pituitary origin. The first was a male thirty-three years old, whose illness commenced at the age of twenty-seven with spasmodic headaches and polyuria; at twenty-nine there was genital impotence; at thirty ocular disturbances occurred, and progressed as the polyuria increased, and obesity developed. He had also a typical bilateral hemianopsia associated with enlargement of and partial sinking of the sella. The adiposity, the impotence with atrophy of the testicles, the changes in the hair system, and the anemia with slight mononuclear leucocytosis, made the complete syndrome. There was no syphilis, but congenital syphilis could not certainly be excluded. Negative Wassermann. The existence of a pituitary tumor was very probable. The second patient was a woman of forty-five who also sought advice for almost complete blindness of the right eye and incipient hemianopsia of the left. The menses had ceased at the age of twenty, just as fairly pronounced adiposity appeared, accompanied by marked anemia. Then changes in the hair supervened, with manifest mental retardation. Bone changes, especially enlargement of the lower part of the face, acromegalic in nature, were noted. Radiographic examination revealed a profound modification of the sella.

Rössle. DYSTROPHIA ADIPOSO-GENITALIS PRODUCED BY MARKED HYPOPLASIA AND ATROPHY OF THE HYPOPHYSIS. [Naturwiss.-med. Gesellsch., Jena, July 20, 1916.]

A man of twenty-seven, bad heredity, was feeble-minded and sickly as a child. He was incapable of following a profession and died of general infection following an operation for *coxa vara* on the right side. Hypophyseal obesity was discovered as a side issue. Length of body 1.62, weight 50 kg., typical, but not very high degree of adiposity. There was hypoplasia of the thyroid (11 gr.), of the thymus (3 gr.), of

the suprarenal capsules (5 gr. altogether) and especially of the hypophysis. The latter was concealed in a very small and rather shallow sella turcica, showed no connection with the infundibulum and on microscopic preparation no posterior lobes could be revived. After fixation in formol the hypophysis weighed 180 mg. (average normal weight 700 mgr. for same age and sex). A microscopic series revealed a single posterior lobe and an anterior lobe subdivided by a multi-chambered cyst with psammoma granules, no trace of the hypophysis stalk. Testicles (those of a 3-year-old boy) and other genital apparatus very much underdeveloped; the seminal vesicle also showed almost complete aplasia.

Bate, R. A. POSTERIOR PITUITARY SECRETION IN THE TREATMENT OF MITRAL REGURGITATION. [Kentucky Med. J., Nov., 1919.]

Regurgitation of the blood, from the left ventricle into the left auricle, during systole, takes place in any condition which prevents perfect closure of the mitral valve. Postmortem examinations have demonstrated the fact that the majority of regurgitant murmurs are permitted by myocardial changes. It is a universally accepted fact that myocardial hypertrophy compensates for the valvular deficiency. So long as compensatory hypertrophy obtains no systemic symptoms of mitral insufficiency are observed; hence, the treatment of mitral regurgitation has been based upon the establishment and maintenance of myocardial hypertone.

It has been shown that the blood regurgitating into the left auricle, while the right ventricle is pumping blood into the lungs, causes congestion of the pulmonary capillaries and dilatation of the right auricle. This is due to increased pressure in the right auricle where lowered pressure is normal during systole; hence, cardiac dyspnea, which is one of the first symptoms of mitral regurgitation, is the result of the pulmonary engorgement.

Hirschfelder, following von Basch, reasons that "the pulmonary stasis does not persist when the action of the left ventricle is sufficiently vigorous"; hence, he says "in the milder cases shortness of breath may be absent." Loomis, with much greater precision, states "so long as the hypertrophied right ventricle is able to fully overcome the abnormal pressure of the blood in the lungs, from mitral regurgitation, the patient is comfortable."

By and by cardiac hypertrophy is followed by myocardial degeneration and dilatation. General venous congestion now may be observed. As the lungs first indicated the primary vascular changes, so the blood enmeshed liver now indicates the secondary changes, which involve all the abdominal viscera. The renal, gastric and other symptoms result from visceral engorgement, just as dyspnea results from the pulmonary dilation and degeneration.

The investigations of McChord, of Ann Arbor, published in 1911, together with many other confirmations since have shown that posterior pituitary secretion constricts dilated blood vessels wherever present. The peripheral, renal, splenic, hepatic, coronary, pulmonary, leg and even embryonic vessels were especially tested by McChord. He thus summarizes: "These experiments show that the posterior-pituitary extract acts on all the vessels of the body,—with repeated administration there may be repeated constriction of the blood vessels."

It has been shown that posterior pituitary secretion diminishes the size of the heart and slows its rate of action. The heart is strengthened. The pressor and the depressor action of pituitary principle is personally believed to be evidence of the autacoid effect of the posterior pituitary principle upon the various endocrinous glands.

It has been shown that the heart has its own independent working system since it has been made to act for days without any connection with the central nervous system. It is suggested that this independent action is probably controlled by the posterior pituitary autacoids.

Sajous has shown conclusively that the action of digitalis is entirely due to its effect upon pituitary secretion. Posterior pituitary secretion has all of the good effects of digitalis without ever being contraindicated by heart block, toxemia, or from any cause whatever. Posterior pituitary principle in mitral regurgitation, then, is indicated because:

1. Its autocoid affect upon the heart produces cardiac excitivity, excitability, conductivity, contractility, and tonicity.

2. By its action in preventing and overcoming venous dilatation throughout the entire system, especially the thoracic and abdominal viscera, by these means compensating and entirely correcting any valvular deficiency. The author is sure that many cases of "rheumatic" endocarditis have been supported to compensating periods by posterior pituitary extract. [Author's abstract.]

Abt, I. A. DIABETES IN INFANCY AND CHILDHOOD. [Endocrinology, Vol. III, pp. 273-284.]

Abt emphasizes that the literature contains no extensive clinical studies on the diabetes of infancy and childhood and that experimental results fail to explain fully the clinical manifestations in man. Glycosuria occurs in the newly-born particularly where trauma has been caused by the application of forceps. Lactosuria occurs sometimes in prematures and in alimentary intoxications. He remarks that lactose and galactose are not easily demonstrated by the ordinary copper tests. He points out many other conditions in which glycosuria occurs.

The sexes are usually equally affected. The peculiar circumstance is remarked that in families affected with diabetes in several generations, the patients are younger the more advanced the generation. Abt's experience indicates that the predilection for diabetes is not

manifest in Jewish children. He states that it would seem more than coincidence that he sees seven to eight non-Jewish children with diabetes to one Jewish child. The factor of heredity probably plays a part, and there are a large percentage of cases that show a familial occurrence. Trauma has an important place in the exciting etiology of diabetes in children. Statistics demonstrate that the injury does not necessarily involve the head. Fifty per cent. of a large series of cases were abdominal injuries. Abt cites a case of a boy of four whose head was struck by a brick falling a distance of four feet. There was not even a scalp wound. Seven weeks after the accident the child had a fully developed diabetes mellitus with 2.8 per cent. of sugar in the urine. Cases are cited of the disease following acute infectious diseases. The existence of diabetes in the mother usually has disastrous effects on the fetus. Conception does not often occur, but when it does premature labor with dead or macerated fetuses and death in infancy from hydrocephalus or diabetes gives a mortality of over 66 per cent. A large percentage of the mothers die in coma.

Some of the best authorities on pathology state that severe diabetes may occur with no demonstrable lesion in the pancreas. Nothing definite has resulted from careful post-mortem examinations.

Concerning true diabetes mellitus, he states the course is progressive, severe and brief. It is striking that diabetes in children is more rapidly transformed from the mild to the severe type. Most cases are not recognized until after the transformation has occurred. His experience shows that many children improve after the sugar tolerance has been regulated and the urinary sugar kept low. They attend school and seem to progress favorably in their studies. At times they gain in weight. The temperature is inclined to be subnormal. When the glycosuria has disappeared, none of the children lose their tendency toward it; sugar returns on the slightest provocation. It frequently reappears following psychic disturbances such as disappointment about a journey or a bad school report. In most cases sugar tolerance can be restored, but an accumulation of insults tends gradually to reduce permanently the level of tolerance. In consequence of this fact infections of the upper respiratory tract or other infections have an ominous significance and tend to produce complications in diabetic children.

The occurrence of other glandular disturbances, injury to the brain and other trauma are discussed. Cases are cited of thyroid deficiency with increased sugar tolerance. On the other hand there is a report of two brothers with myxedema and diabetes who were favorably treated by thyroid feeding. The father was a neuropath and the mother was obese and diabetic. The occurrence of glycosuria in association with neoplasms, hemorrhage and abscesses of the brain and hydrocephalus calls forth considerable comment and is largely illustrated by case histories. Abt asserts that whether there is a carbohydrate metabolism

center or removal or nervous influence over the chromaffin system the fact remains that permanent glycosuria occurs in cases of cerebral disease, especially lesions of the floor of the fourth ventricle.

He concludes from his experience that the younger the individual with diabetes the more marked is the tendency for the disease to pass suddenly from the mild to the severe type. Cases which he considered mild at the time and amenable to diabetic treatment nearly always terminated fatally in the course of several months or a few years. In this connection he points out that reports of mild diabetes in children in the literature fail to impress many observers of long experience because the further course of the cases reported is not available. [Author's abstract.]

Jackson, D. E., and Mills, C. A. PHARMACOLOGIC PROPERTIES OF THE ACTIVE PRINCIPLE OF COMMERCIAL PITUITARY EXTRACTS, AND OF THE COMPARATIVE ACTION OF HISTAMINE. [Jl. Lab. and Clin. Med., Oct. 1919.]

By means of an accurate method for measuring very slight changes in the state of contraction of the bronchioles of the lungs, Jackson and Mills studied the action of various commercial preparations of the pituitary gland, histamine, mixtures of histamine and tyramine, and mixtures of histamine and pituitary extracts. For a detailed description of the method used to record the bronchiole contractions reference must be made to the original article or to Jackson's *Experimental Pharmacology* (C. V. Mosby Co., St. Louis, 1917). Tracings were made simultaneously of the lung contractions and blood pressure, and, in several cases, of the uterine contractions as well. Use was made only of dogs in which the brain, and often the entire cord, had been completely destroyed. This obviated any effects of the drugs on the central nervous system and showed only the direct effects on the tissues concerned.

It was found that, while, most pituitary preparations and histamine had a like effect in stimulating the uterus, their effects were entirely different on the smooth musculature of the lungs. Histamine always contracted the bronchioles in strict proportion to the dosage administered, but pituitary preparations varied. The preparations of Parke Davis and Co., Armour, Burroughs, Wellcome & Co., Mulford and Heister were tested, and while the uterine effects of these preparations are qualitatively similar, some of them show no effect whatever on the lungs, causing neither dilation nor contraction, while others show a moderate constricting effect closely resembling that produced by histamine. The preparation of Burroughs Wellcome & Co. shows this effect in the greatest degree, that of Mulford next, while Heister's preparation shows a faint constricting influence and Armour's and Parke Davis & Co.'s products show no effect whatever on the lungs. The authors

hold, contrary to the conclusion of Abel and Kubota, that histamine is not a necessary constituent of active preparations of the pituitary gland, although some preparations may contain detectable amounts of the drug either from accident or from intention to increase the oxytocic power of the preparation. It is suggested that this method of recording accurately the contraction of the bronchioles may prove useful in detecting commercially the presence of small amounts of histamine in extracts of the pituitary gland.

Since most pituitary preparations show no constricting influence on the lungs, the authors hold that they should be used for obstetrical purposes rather than the broncho-constricting histamine.

Experiments were also carried out in an attempt to find a suitable proportion of histamine and tyramine that could safely be used in place of pituitary preparations as a uterine stimulant. The tyramine serves to effectively offset the blood-pressure-lowering effect of histamine, in fact the blood pressure may be made to rise instead of fall. But in no case was tyramine found to counteract in any degree the broncho-constricting influence of the histamine. And in order to have a sufficient amount of the latter drug present to act as an effective uterine stimulant, there would always be the danger of an excessive broncho-constriction. If the histamine amount be reduced so as to give no effect on the lungs, then its uterine effect is negligible.

As further proof of the absence of histamine from ordinary pituitary extracts, the authors added small amounts of the former to pituitary extract and injected the mixture intravenously. The results showed typical effects of histamine on the bronchioles solely in direct proportion to the amount of histamine contained in the mixture injected, while pure pituitary preparations alone showed no effect whatever on the bronchioles.

The authors concluded that, since pituitary extracts cause contraction of certain large groups of smooth muscles, such as the uterus and arterioles, but fail to cause contraction of the bronchioles, the action is in all probability due to a stimulating effect on certain nervous elements (probably divisions of the autonomic nervous system) and not due to a direct stimulation of smooth muscle fibers, as has heretofore been supposed.

None of the responses of the bronchioles to any of the drugs mentioned in the paper were in any way affected by a previous injection of atropin. [Author's abstract.]

Simpson, Sutherland, and Hunter, Andrew. THE POSSIBLE VICARIOUS RELATIONSHIP BETWEEN THE PITUITARY AND THYROID GLANDS. [Quar. Jour. Exp. Physiol., Vol. IV, No. 3.]

The experiments described in this paper were undertaken with a view to determine whether there is any evidence that the pituitary gland takes on the function of the thyroid after the latter has been removed.

This theory was first put forward by Rogowitsch in 1888. Assuming that the iodine-containing body in the thyroid—iodothylin or iodothyroglobulin—represents the active principle of the gland, diminution or absence of which leads to hypothyroidism, if there is compensatory activity on the part of the pituitary following thyroidectomy, then one would expect to find some evidence of this iodine-containing body in the pituitary.

In all, twenty lambs, from seven to eight months old, and twenty-two adult sheep were used. A few were kept as controls and the rest were thyroidectomized. To make certain that iodine was being ingested to one group of twelve sheep six grams of sodium iodide was administered daily with the food,—half a gram to each animal.

After an interval of from five to six months the lambs and sheep were slaughtered, the pituitary bodies removed and examined chemically for the presence of iodine. Enough material was obtained for five analyses; all gave negative results. The evidence here is against the idea of a vicarious action.

Compared with normal animals of the same age there was some increase in the size of the pituitary both in the thyroidectomized lambs and sheep. In the lambs the increase amounted to about 15 per cent., and in the adult sheep to about 20 per cent., in from five to six months. [Author's abstract.]

Kennaway and Mottram. THE RELATION OF DISEASE OF THE PITUITARY TO DIABETES INSIPIDUS. [Quarterly Jour. of Med., April, 1919.]

These authors describe two interesting cases of diabetes insipidus and review the recent literature of this disease and of the function of the pituitary gland. In the first case, the condition followed a stab wound of the first orbit and was transitory. In the second, a case of metastases from a carcinoma of the breast, there was a large shadow in the skiagram, just above the sella turcica, and the etiological factor apparently was a metastasis to the pituitary. The chlorine in the urine in the first case was 18 times more dilute than in the plasma, whereas normally it is $1\frac{1}{2}$ times more concentrated. The urea was only four times more concentrated in the urine than in the blood, while under normal conditions a concentration of sixty to eighty-fold takes place. After the administration of salt the molecular concentration of the urine remained unaltered, indicating a loss of power of concentration of the part of the kidney.

Pituitrin, given subcutaneously, diminishes the amount of urine to about one half the previous amount, while administration by mouth was without effect. Reduction of the amount of salt and protein in the diet was followed by only a transitory drop in the diuresis. Mirkonski has observed that such a diet is effective in some cases but not in others.

The question of the effect of pituitary extract on diuresis may now be regarded as settled. In animals and in normal men a reduction in the amount of urine is constantly met with. In the case of animals, this action may be preceded by a transitory diuresis. The reduction after a single injection persists about eight hours. The active principle is contained in the posterior lobe, for anterior lobe preparations are without diuretic action. Administration of extracts by mouth is without effect. Motzfield, however, has recorded success in a case of diabetes insipidus following the ingestion of the whole gland.

The authors review the literature on the association of disease of the pituitary with diabetes insipidus. They tabulate nineteen cases with autopsy in which gross disease of the gland was present. They found no recorded cases in which the hypophysis was found normal at autopsy. On the other hand, in five cases with involvement of the posterior lobe, no polyuria occurred. Moreover, cases have been published in which polyuria occurred in pregnancy, to disappear after parturition. It would seem, therefore, that disease of the pituitary is the cause of diabetes insipidus in most cases, if not in all.

The experimental investigation of the pituitary has not yielded uniform results, so far as its relation to diuresis is concerned. The effect of pituitary extract in diabetes insipidus constitutes the strongest evidence of the normal activity of the gland in regulating the secretion of urine.

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Elsberg, C. A. NERVE SUTURE AND GRAFTING. [Journal A. M. A., Nov. 8, 1919.]

This author makes the following suggestions of surgical principles in the technic of suture and grafting of peripheral nerves. A good knowledge of anatomy is required in the identification of the injured nerves as well as care and patience and experience. If the surgeon will first expose a normal part of the nerve or nerves below and above the lesion, and work from normal to scar tissue the identification of injured nerves and their branches even in complicated plexus injuries is always possible. The lower end of a divided nerve should always be exposed and freed first because it is the degenerative end. The upper end should be exposed as briefly as possible and handled with special care without tension to approximate the ends. If there is no actual separation of the nerves, but only a bulbous thickening, this should be examined with the utmost care before being cut across. Whether there are signs of complete interruption or not, the bulb should be carefully incised lengthwise in search for nerve bundles that can be saved. If superficial, they can be easily separated, but when deep may require much patience

and care. When it is shown that there is complete anatomic discontinuity of the nerve, the bulb or end bulbs should be divided transversely in successive sections, until normal funiculi can be recognized. As the upper end of the injured nerve is often swollen, perfectly good funiculi may appear edematous or glairy. Usually there is fairly active bleeding from the intravenous blood vessels when normal funiculi are reached, and this is especially noted in the sciatic nerve and its branches, and in the median nerve. Usually this can be controlled by gentle pressure, but sometimes fine mosquito forceps must be used and ligation of the vessel with very fine catgut or silk. When the peripheral end bulb is being cut, the ends appear like smooth, shiny scar tissue until a point is reached where there are many normal funiculi without any scar tissue. In section of the central bulb the transition from scar to normal is much more gradual. To prevent rotation of the nerve ends and distortion of the nerve pattern, the epineurium must be grasped a little cephalad and a little caudad to the points where the final sections will have to be made. There is probably a definite pattern and arrangement of the nerve funiculi and even the nerve fibers. Elsberg is studying peripheral nerve operations on the human cadaver and finds in most nerves definite groupings of the funiculi at different levels, often so regular that they can be properly brought together in the suture of the two ends. This should be made without tension, but due consideration should be given to the location of branches. The tension can perhaps be prevented by flexion of adjoining joints. The suture itself is a very delicate operation which is described in detail. If the sutures are well placed a fairly accurate apposition of the ends of the nerve funiculi is possible. All the perineural sutures should be passed before tying. If tied too tightly the funiculi are bent at the ends with resulting poor approximation. Transplantation of nerves to a more superficial level is sometimes necessary, and of this the technic is too minutely described to admit of brief abstracting. We have not yet any definite answer as to how these grafts act. If the condition of the nerve permits it a neurolysis is always better than a resection and suture, and the latter far better than grafting. The era of perfect peripheral nerve surgery, Elsberg thinks, is still to come. The article is illustrated.

McMurray, T. P. TRANSPLANTATION OF NERVES IN GUN-SHOT INJURIES. [Journ. Orthop. Surg., Vol. I., No. 3.]

For some unknown reason end-to-end nerve suture is not always successful, nor is it always possible to bring the ends of divided nerves into apposition. In other cases nerves may be involved in intensive septic trouble with irreparable damage to their structure and function. The grafting of cutaneous nerves to fill gaps in divided motor nerves has been tried by the author and he has concluded that a certain number of patients must be condemned to great disability if procedures involv-

ing the nerves are followed exclusively. Actual loss of muscle substance often nullifies the effects of nerve recovery. In many of these cases tendon transplantation holds out the only hope for recovery of function. In the forearm the muscles which can be transplanted, are the *flexor carpi radialis*, the *flexor carpi ulnaris*, the *palmaris longus* and the *pronator teres*. These may all be used for other functions without the normal movements being disturbed to a great extent. In the case of radial nerve paralysis, the only muscle which will produce dorsiflexion of the wrist, is the *pronator teres* and its tendon must be fixed to both radial extensions of the wrist. The *flexor carpi radialis* has a long tendon and may be brought to the dorsum of the wrist with ease, but the *flexor carpi ulnaris* has a very short tendon necessitating dissection of the muscle from the ulna for about 7.5 cm. Care must be taken that the tendons are not bent at an angle round a hook of bone or the edge of the fascia. For this reason, long incisions are advocated. The *flexor carpi radialis* is inserted into the *extensor brevis pollicis*, and the *abductor pollicis* into the *extensor indicis*. The *extensor pollicis longus* is not included, because extension of the terminal phalanx can be carried out by muscles of the thenar eminence. There are several methods of fixing the transplanted muscle. The author advocates two. In the first method the transplanted tendon is divided, one half is passed above, the other half below the receiving tendon or tendons and the two sections united after passing beyond the receiving tendon. The transplanted tendon is also sutured to the receiving tendons. The second method is to divide the receiving tendons from their muscles and to pass their free ends through the transplanted tendons at different levels. The author lays stress on the necessity of leaving no exposed raw surfaces. The line of suture is closed with two layers. The fingers should never be hyper-extended, but should be put on a splint with about 10° flexion for each joint. Of all transplantation of tendons, that for radial paralysis is the most successful. In this case, however, it is useless to transplant median and ulna muscles which are not strong. In a case of ulna paralysis with complete loss of nerve, the function of flexion in the third and fourth fingers may be restored by suturing the *profundus* and the *sublimis* into similar structures supplied by the median. In complete median paralysis, the *extensor carpi radialis longior* is transplanted into *flexor longus pollicis* by lateral implantation. In the case of deltoid paralysis the author prefers arthrodesis of the shoulder. This enables the patient to make full use of the trapezius and other scapular muscles. In the case of paralyzed quadriceps the author advocates transplantation of both the biceps and the *semi-tendinosus*. The knee is kept straight for about six weeks. In paralysis of the common peroneal nerves, tendon fixation of the *tibialis anterior* and *peronius brevis* gives a good result. In the case of paralysis of plantar flexors of the foot, the *tendo-Achillis* is split into two and one half is embedded in the tibia.

Powell, W. L. PERIPHERAL NERVE INJURIES. [Southern Medical Journal, June, 1919.]

Powell calls attention to the following points: (1) In any peripheral paralysis, whether from injury or disease, a definite diagnosis of the nerve involved can be made only after a careful study of the nerve supply of the groups of muscles affected. (2) There is very little hope of muscles recovering their contractile power unless they are put in an absolutely relaxed position, and not allowed to become stretched even for a short time, and their nutrition kept up by the judicious use of massage and electricity. (3) When the contractile power begins to return the patient must be encouraged to exercise that power voluntarily, without ever allowing any stretching of the muscles. (4) Early suture of completely severed nerves is essential if the best results are to be procured. (5) In the search for a nerve embedded in scar tissue, always locate the nerve in the normal tissue and follow it through the abnormal tissue. (6) In injuries of the extremities always make a careful examination for nerve injury during the primary examination and before applying any permanent dressing.

Ney, K. W. NERVE INJURIES. [Journal A. M. A., Nov. 8, 1919.]

Ney describes the pathologic processes in lesions of peripheral nerves which were rather common complications of gunshot injuries, and especially of shell wounds, in the recent war. There may be a complete division of the nerve trunk or only a partial one, and function of the part supplied is usually immediately lost. If the fibers are divided, function is not restored until they are completely regenerated. When scar or other interposed tissue prevents the downgrowing axis-cylinders from reaching the divided end of the distal segments, they stray in all directions and form a bulky mass of nerve tissue which constitutes the neuroma frequently found on the proximal end. Scar tissue contracting about a divided nerve or within a nerve trunk destroys the regenerative activity, and a nerve that is not immediately injured may be caught and compressed until its function is lost with degeneration of the axis-cylinders. Such lesions do not develop a neuroma, and when sectioned the ends present a rather gelatinous appearance which may extend some distance up and down the nerve trunk. After many sections in such cases to find normal tissue, nerve suture has been used by Ney rather than grafts. The majority of patients with peripheral nerve injuries recover without operation, but a considerable time often elapses. Ney reckons the growth of a regenerating axis-cylinder to be from 1.5 to 2 mm. a day, if not hindered by scar tissue or sepsis. Practically all war wounds are infected, and it is not safe to operate on wounds recently healed as it may arouse dormant bacteria. Ney has found it unadvisable to operate in the vicinity of wounds which have suppurated until they have been completely healed for at least three

months. The point also arises, then, as to how much progressive nerve degeneration has taken place. It is not enough to say a certain group of muscles are paralyzed, but the slightest function of every muscle should be tested, and the examination and recording of sensory disturbances is of great value. Accurate charts should be made at each examination to show the area involved. Electrical examination is of value in diagnosis, but less so in determining the presence or absence of regenerative changes. Muscular tone is lost from the time of injury and is manifest only a short time before actual voluntary movements. Ney does not believe that a properly conducted aseptic exposure of a nerve and freeing it from scar tissue is liable to do much harm, but there is perhaps too great a tendency in such cases to resort to resection and suture. When the neuroma that tends to form on the retracted nerve is absent it is almost impossible to differentiate between anatomic division or strangulation of the nerve trunk. We are not able at the present time to make nerve suture perfect as regards the physiologic topography. When the proximal end of a divided nerve is mechanically irritated, the patient feels a tingling sensation in the area of its sensory distribution and the progress of the downward growth of the axis-cylinder may be very accurately followed by gentle tapping along the course. At first the formication can be elicited only at the level of the lesion, but at the end of six weeks, if regeneration is progressing, it may be found an inch or an inch and a half below the point, and still further later. This means that certainly some sensory fibers have been able to bridge the gap and this sign of formication has a definite prognostic value depending on its intensity and rate of progress.

Coriat, I. H. TINEL'S SIGN OF NERVE REGENERATION. [Boston Medical and Surgical Journal, August 7, 1919.]

The author refers to Tinel's sign of tingling or formication produced by pressure on the injured nerve. Although not a sign to be relied upon alone, he considers it very valuable when taken in connection with others. He says that the test is very easily applied, but should be carefully done in each case, as the tingling produced by neuroma formation may lead to error. In neuroma formation or in the early stages of regeneration without neuroma formation, the formication is limited to the level of the lesion. In the neuroma formation also, where the regenerating axis cylinders are blocked and may consequently lose themselves in the surrounding tissues, the formication remains fixed at the level of the lesion. In actual regeneration of the nerve the formication progresses over the zone of the growth of the axis cylinders and can finally be detected along the partial or entire cutaneous distribution of the nerve. For a time it may involve the entire cutaneous distribution, but as regeneration becomes complete, it finally can be detected only in the extreme periphery.

The exact cause of this formication it is difficult to state, but since it can be produced by a far lighter pressure than formication in an uninjured nerve, it probably is due to an increased sensitiveness of the young axis cylinders. It is best, however, not to rely upon the formication sign alone. The test should be carefully correlated with the other investigations of the nerve lesion, such as protopathic and epicritic sensibility, regenerating pain points, and electrical reactions.

Burke, H. M. THE TREATMENT OF INJURIES OF PERIPHERAL NERVES.
[Arch. Radiol. and Electro-Therapy, July, 1918.]

Burke sets out to prove that some form of electrical treatment is absolutely necessary in nerve injuries. He states that the attitude of those who do not believe in electrical treatment is due to ignorance of the possibilities of the various forms of electricity, to custom and fashion in treatment and to the fact that electro-therapeutists have been too modest. The author briefly describes the clinical and pathological changes which occur in the injured nerve and in the muscles and other structures supplied by the nerve. As regards treatment the obvious aim is to keep up nutrition. For this purpose massage is useful but is insufficient. Electro-therapeutists have observed improvement by using electrical treatment in addition. Warmth is beneficial whether produced by extra covering or such agents as whirlpool baths. A better result is obtained by diathermy and galvanism, while the sinusoidal and faradic currents have nutritive effects. In a severe stage of paralysis the actual contraction of the paralyzed muscle is not advocated but can be employed later when recovery is proceeding and voluntary power is expected to return. Even in the absence of electrical response, rhythmic galvanic or sinusoidal currents are said to produce good effects. The methods most favored by the author for the production of contractions are Bristow's with the faradic current and Cumberbatch's with the galvanic and water resistance. As regards posture of paralyzed muscles, the author does not believe in rigidly maintaining the position of rest, but gives joints their full range of passive movements. Splints with springs to recover the position of rest are to be preferred to rigid splints. In the treatment of injury of the actual nerve the galvanic current can be used without fear of doing harm. The electrolytic action helps nature to remove offending particles. Massage at the site of lesion in the early stages is inadvisable, but diathermy may be used. In nerve compression galvanism, heat, massage and X-rays are considered useful. In complete division the passage of an electric current seems to stimulate regeneration. The control of the treatment of nerve injury should be under physiotherapists.

Hunt, J. R. THE TRANSMISSION OF MOTOR INFLUENCES IN PERIPHERAL NERVES. [Brain, Parts III. and IV., 1918.]

Hunt suggests the recognition of two physiological systems for the transmission of motor impulses in peripheral nerves, this in place of the "final common path" as enunciated by Sherrington. He says that if motility be resolved into its component parts, three fundamental types of movement may be recognized, each corresponding with a stage in phylogenesis. Thus, there are reflex movements, primitive and related to different levels of the segmental nervous system; there are automatic and associated movements, higher and controlled by certain infra-cortical centers, and lastly there are isolated, synergic movements, highest of all and of cortical origin. As to the conducting pathways for the needful impulses, those of cortical origin follow the pyramidal tracts; those for automatic movements follow the strio-spinal system, an old and primitive mechanism which is the homologue of the basal fore-brain bundle and the primary motor fasciculus of lower forms; while the impulses for typical reflex movements have a purely spinal tract. These fundamental types of movement are fused by the integrative action of the nervous system, but may be unmasked by the accidents of disease. Hunt thinks that just as there are protopathic and epicritic forms of sensibility carried by peripheral nerves, so also there are paleo-kinetic and neo-kinetic functions and he marshals a number of facts in support of his belief. First, he points to the sequence of events in the restoration of function after injury, where crude associated movements return before dissociated movements, just as protopathic returns before epicritic sensibility, both showing prior regeneration of the primitive nerves. Then he quotes an old-standing case of musculo-spinal paralysis, in which there was no return of the isolated movements of cortical origin, as, for example, extension of the wrist, thumb and fingers and yet all the involved muscles would contract strongly on making a fist, a primitive movement probably related to the climbing period of man's ancestry. Similarly, after facial palsy automatic and associated movements may be regained, while isolated movements of cortical origin remain absent. Next he draws attention to the two elements in muscle, the anisotropic disc system, which is supposed to subserve the function of quick contraction, or the twitch, and is supplied by motor cells of the spinal cord, and the sarcoplasm, which is concerned with slow tonic forms of contraction and is innervated by the sympathetic. He suggests that they respectively represent neo-kinetic and paleokinetic motility. He argues that variations in the classical types of spasticity and rigidity can be explained on his hypothesis; thus the rigidity, the deformity and the condition of the reflexes in the case of old-standing cortical hemiplegia, representing a neokinetic loss, are wholly different from those of *paralysis agitans*, dependent upon a strio-spinal lesion and representing a paleokinetic loss.

Lastly, in the cerebellum he sees two great functional divisions, a paleocerebellum, which controls the postural or static function of automatic and associated movements, and a neocerebellum for the postural control of isolated synergic movements of cortical origin. [Med. Jl. Australia.]

2. CRANIAL NERVES.

Uthoff, W. HEMIANOPTIC DISTURBANCES OF VISUAL FIELD FROM GUNSHOT INJURIES. [Klin. Monatsbl. f. Augenheilkunde, Bd. LV, 104.]

Four cases of double hemianoptic disturbances of the visual field, of which two were cases of hemianopsia inferior, were observed. Such cases do not occur with thrombotic softening of the brain. The observations led to the assumption that the upper lip of the calcarine fissure corresponded to the upper reticular portion as well as to the lower portions of the visual field. Hemianopsia superior was almost entirely lacking in the material observed. Two patients with homonymous hemianopsia still retained small remnants of the visual field in the blind hemispheres, explicable by the peculiar course taken by the shot. The functional disturbance of the hemianoptically attacked portion of the ocular field varies in intensity, but the expansion of the involved part is always symmetrical. Distinct fatigue phenomena were noted in which the intensity of functional disturbance in the eye examined first appeared less than in the eye last examined. The half visual field retained was somewhat diminished, concentrically. In all cases except one, the patients had good acuity, although they were temporarily blinded (from 7½ hours to 4 weeks) by the injury. Recovery in the disturbed field of vision was marked. The ophthalmologic report was normal, provided no intracranial complications arose which might induce the formation of a filling papilla. Total achromasia occurred in only one case. Paralysis of the eye muscles did not occur in any of the nine cases observed. Optic memory was seriously affected in some of the patients, as was also the memory of the period immediately preceding the injury.

Best, F. HEMIANOPSIA AND PSYCHIC BLINDNESS IN CRANIAL INJURIES. [Gräfes Archiv, 1917, Bd. 93, No. 1.]

Of men semiblinded by the war, 30.2 per cent. had bi-ocular, 25.8 per cent. right-sided, and 44.2 per cent. left-sided hemianopsia. Complete blindness was not found even in bi-ocular semiblindness. Death occurred in 12.8 per cent. of the cases. Monocular semiblindness with straight limit through the focus was met with once, with macula retained, but with complete lapse of the periphery in 3.5 per cent. of the cases; retained periphery and complete lapse of macula in no cases. In recent cases of semiblindness there was preponderating lapse in the lower portion in 58.1 per cent., while in only 5.8 per cent. did the upper preponderate. Paracentral double scotoma without lapse of the periph-

ery was observed in 3.5 per cent., double scotoma with concomitant peripheral defect in 12.8 per cent., inferiority of the macular region with peripheral lapse in 25.6 per cent., while in 38.4 per cent. only peripheral lapse without paracentral and central disturbance was found. Difficulty in lateral vision was reported in 20.9 per cent. In 18.6 per cent. the pupil on the same side as the lapsed visual field was enlarged, the opposite one in 7 per cent. Nystagmus was present in 10.5 per cent., abducens paralysis (partial) in 4.7 per cent., oculomotor paralysis (partial) in 2.3 per cent., paralysis of all eye muscles in one case. Inaccurate optic localization is the regular accompanying phenomenon of hemianopsia, the simplest test for this, halving of distances, was carried out typically in 24.1 per cent. (the shortest distance on the side of the semiblindness), and atypically in 36 per cent. In 31.3 per cent. of the cases the semiblindness was associated with a disturbance of optic comprehension (optic numerical disturbance), in 5.8 per cent. with optic agnosia. In 25.6 per cent. alexia accompanied the disturbances, and agraphia in 14 per cent.

When an incomplete semiblindness occurs, as is usually the case in injury of the calcarine region, all visual functions in that sector, as well as all perception of bright colors and light, together with peripheral acuity, is disturbed. There is no particular center for bright colors in so far as it concerns agnostic, amnesic and aphasic disturbances of the color sense. The seat of the cerebral center of vision for optic spatial perception is the calcarine. The location of the cerebral macula could not be determined. Replacement on each half of the macula in both cerebral hemispheres is however highly improbable. The rarity of total lapse of half the visual field is explained by the relatively great extent of the calcarine, the lower portion of which is almost never wholly destroyed, while the patient lives, on account of the proximity of the cerebellum. This explanation also serves for the rarity of complete failure of macular stimuli.

Optic reflex eye motions, especially functional motions and convergence, are produced from the calcarine. This is the center of relative optic localization, in brain injuries to this portion relative and absolute disturbances of localization arise, an analysis of which the author has attempted. Other cortex regions must be taken into account together with the calcarine, for the localization of visual objects. Almost all spatial relations in reference to the body are lost without these. Other visual disturbances, alexia and agraphia, are connected with left-sided brain injury. They have no common memory field however. Primitive optic-agnostic disturbances (including numerical disturbances) are observed in injuries of both the right and left brain. Acute psychic blindness only occurred in injury to both sides. Spatial disturbances of optic recognition are connected with injuries to cortical fields other than those of the amnesic-agnostic disturbances.

Sklodowski, J. CONJUGATED OSCILLATIONS OF THE EYE IN CEREBRAL LOCALIZED DISEASE. [Ztschrft. f. d. gesmt. Neurologie u. Psychiatrie, 1916, Bd. 31, 1-3.]

The patient, a man of sixty-six, suddenly lost consciousness completely. At first sight a peculiar eye phenomenon was observed. Both pupils were engaged in an automatic constant coördinated motion, alternating to the left and right. This motion was fairly slow and rhythmic, constant in oscillatory frequency, sixteen times in each direction per minute. The scope of the oscillation was so great that in a lateral position the rim of the tunica reached the corresponding corner of the eye.

The phenomenon continued at the same rate for more than forty-eight hours until the patient's death, with the possible modification on the second day of a somewhat more pronounced divergence to the right. The writer also observed that in addition to the slow broad oscillations, there were rapid lateral nystagmic twitchings.

Examination of the nerves gave the following result: pupils of moderate size—the right a trifle the wider—changed diameter somewhat in the motion of the eyeball. The face which was turned straight forward did not participate in the ocular motions and was not distorted. The left extremities hung down in lifeless fashion. Triplex reflex was present to an equal extent on each side. Radius-periosteum reflex was noticeably weaker on the right side; patellar reflex lacking on both sides. Babinski phenomenon, scrotal and abdominal reflexes weak on each side muscle tension insignificant everywhere. Skin pricks both on the left and on the right side produced slight defensive motions without general marked reaction.

The autopsy revealed the following: Endocarditis chronica fibrosa v.v. cordis, præcipue v. bicuspidalis et v.v. semilunarium aortæ. Pericarditis adhæsiva totalis. Cirrhosis hepatis annularis. Induration-cyanotica renem. Pneumonia lobularis, confluens lobi inferioris et medii pulmonis dextri. Ramolitio circumscripta hemisphærii dextri cerebri.

Closer examination of the brain showed an extensive area of softening on the outer surface of the right cerebral hemisphere principally in the lower parietal lobe and to a certain extent in the posterior portions of the two upper temporal convolutions, as well as in the adjacent occipital lobe portion of the corresponding region. This is the area supplied with blood by the fourth branch, the third and fourth according to Monakow's distribution, of the arteria fossæ Sylvii. The most pronounced softening occurred in the gyrus angularis. Even the tissue was wholly destroyed here. The circumscribed area was in the shape of an elongated triangle, the apex of which fitted into the rear part of the first temporal convolution, and whose base extended in the direction of the occipital lobe. The supramarginal convolution was almost

intact; an unimportant softening was found in the part adjacent to the angular convolution.

The circumscribed area in horizontal cross section was also triangular in shape, with base on the outer surface of the brain, while the tip of the posterior horn was turned toward the lateral chamber. Here also it was apparent that the circumscribed area had infringed upon the angular convolution chiefly, but had also extended to the extreme posterior portion of the two first temporal convolutions as well as to the foremost and outermost part of the occipital lobe. Within it approached close to the *radiatio occipitothalamica* Gratiolet. It looked as if the outer portion of the radiation had been affected by the softening at least. The sphenoid and presphenoid convolutions were uninjured.

Microscopic examination revealed a fairly abrupt transition from softened portions to sound. In the latter atheromatose alterations were demonstrable only in the vesicles.

Logically the eye symptom points to anatomic circumscribed lesions in the brain, but closer investigation into the nature and mechanism of this symptom presents serious difficulties.

Conjugated ocular oscillations must be considered an active motor phenomenon, consequently the result of excitation of a certain brain function. They cannot originate in a portion of the brain that has been completely destroyed, in this case the angular convolution. The region of primary irritation would be either in the close-lying, more or less intact cortical regions (principally the occipital convolutions) or in the intact white substance beneath the circumscribed area, in which the projection fibers from the posterior visual centers probably run to the gray rami of the motor eye nerves in the brain stem. In both cases the area of softening itself plays the only passive part in a mechanically effected stimulus produced by pressure.

Whether the primary irritation be localized in the cortex or in the subcortical substance, the brain centers play an important part in the pathogenesis of conjugated ocular oscillations; for here the continuous excitation arising from constant irritation in a higher brain portion, is probably translated into a rhythmic series of motor impulses for the corresponding eye muscles.

It is still a question how a one-sided circumscribed disease can occasion a double symmetrical phenomenon. With one-sided stimulation one would expect the pupil to deviate in the opposite direction, but without crossing the central line on its return. The oscillations were symmetrically carried out in both directions however. It seems most probable that after the active phase, an exhaustion phase occurred in the subcortical center, during which the center of the opposing side gained prominence.

Dimmer, Jr. TWO CASES OF GUNSHOT INJURY TO THE CENTRAL VISUAL PATHWAYS. [*Wiener kl. Wochenschr.*, 28, 519, 1915.]

In one case a quadrant hemianopia occurred, in the other absolute homonymous scotoma of congruent form in the right lower quadrant of both visual hemispheres. The second case is of interest for the theories of central macular replacement. This case favors Wildebrand's view of over-compensation of the most central portion of the field of vision in both hemispheres. In that portion of the visual center and of the visual radiations starting from there, related to the smallest pericentral visual field, there is an analogous localization of individual portions of the retina. For only a quadrant of this smallest pericentral visual field has been eliminated and this is joined to the peripherally situated portion of the whole scotoma. The center of the macula region should be localized in the anterior portion of the calcarine fissure.

Marie, P., and Chatelin, Ch. VISUAL DISTURBANCES RESULTING FROM LESIONS OF THE INTERCEREBRAL OPTIC PATHWAYS AND OF THE CORTICAL VISUAL SPHERE IN GUNSHOT WOUNDS OF THE HEAD. [*Rev. Neuro.*, 1919, Nos. 23-24, pp. 882-925.]

The authors studied thirty cases of cranial injuries in which various disturbances of the visual field were found. Under ordinary conditions most lesions of intercerebral optic pathways and of the visual sphere have a vascular origin, a more or less extensive softening of cerebral material. Here the destruction of cells and fibers is massive and whole sections are annihilated. In the wounded, however, when the disruption is over and the blood reabsorbed, the lesion is very limited. It lies in healthy tissue, since the brain is usually young, the vascular system intact, and the possibility of reconstruction great. From their own observation the writers believe that the cortical center of vision is localized at the calcarine scissure and on the adjacent cortex (lower portion of the cuneus, upper part of lingual lobe). They also believe that there is a systematization of the cortical sphere such that the upper quarter of the retina on one side is projected to the upper lip of the calcarine of the other side, so that the destruction of this latter produces hemianopsia of the lower quadrant; that a restricted lesion of the cortical visual sphere on one side reveals itself by a hemianoptic scotoma in each half of the visual field on the opposite side. The systematization continues in the radial sections closest to the cortex so that a restricted radial lesion gives the same type of scotomata as restricted cortex lesions. The writers emphasize in cortical lesions, the fact that hemianoptic failings have the following characteristics: their outlines are distinct, and do not alter with time; they are entirely or very nearly congruent; they are caused by a definite destruction of a recognized portion of the cortex or of the white matter directly beneath. In regard to the projection of the macula upon the calcareous cortex, they

favor the posterior localization in the region of the tip of the occipital lobe. According to their observations if the wound is superficial the scotoma is purely macular; if it is more profound, the scotoma increases in size. It may be either macular or paramacular. Finally if the lesion affects only the anterior portion of the visual sphere, the scotoma is peripheral. Nothing, the authors conclude, justifies the existence of a special cortical center for color vision.

Axenfeld, Th. HEMIANOPIC DISTURBANCES OF THE OCULAR FIELD OF CRANIAL SHOT WOUNDS. [Klin. Monatsbl. f. Augenheilk., B. LV, p. 126.]

Eight cases were considered, four biocular hemianopsias, one of hemianopsia inferior. Here the injury was exclusively on the right side, caused by a tangent shot; the effect of the injury may, however, extend beyond its original seat, and the occipital flap may be injured as well. Cases of asymmetries of defects, one of hemianopic scotomata, were also observed. The extension of relative defects was symmetrical, of the absolute defects included therein, asymmetrical. All the initial blindnesses have disappeared. One case of filling papilla was induced by disrupting brain portions and hemorrhage. In one case a hemianopic quadrant defect was present in the upper half of the visual field. In another terrifying hallucinations had their origin in the defective portion of the field of vision. In spite of the fact that the injury appeared to be cortical, it must be assumed that subcortical portions were injured, which again emphasizes that the distant effect of the injury must not be neglected.

Blue, Robert. MACULAR DEGENERATION. [Journal A. M. A., Nov. 1, 1919.]

Blue adds one to the reported cases of macular degeneration occurring in two or more children of the same parentage, and of the type originally described by Dr. R. D. Baten and subsequently by Stargardt, Pusey and others. "The most striking feature of this disease is that it is familial; conformity to Bolling's laws of heredity has been complete in all reported cases. The lesion is macular in the beginning and is rather closely confined throughout the course of the disease to this area and its immediate vicinity. Subjectively, this is evidenced by a central scotoma with no restriction of the peripheral field. The disease in all reported cases to date begins in early childhood; the fall in central vision is rather rapid to the point where reading is laborious. From the subjective standpoint it is slower from this point forward, and after reaching a certain grade may remain stationary for years. Blindness never supervenes. Mental deterioration does not occur. Those afflicted with it are of average intelligence and health, the only abnormal feature being the visual disturbance and the macular and perimacular lesion."

Blue gives the history of a case, the first to be reported which departs from Bolling's law of heredity—it occurs in two generations. The late appearance in the father might render his case questionable were it not that his symptoms parallel those of his daughter and of all typical cases reported. Blue discusses the literature of the subject, and notes some of the specially peculiar points. Its etiology is unknown. In the limited number of cases known Jews are in the minority, and the females have a slight predominance, though sex has not played, thus far, any very marked rôle. The disease is bilateral, and is slowly progressive after a rather rapid initial onset, after which it may remain stationary for varying periods, or visual acuity may be almost imperceptibly but steadily diminishing. Macular blindness may result but the peripheral retina is spared and there is no apparent mental deterioration.

3. SPINAL CORD.

Herrick, W. W., and Dannenberg, A. M. CEREBROSPINAL FLUID. [Jour. A. M. A., Nov. 1, 1919.]

These authors review the facts of the physiology of the cerebrospinal fluid, giving references to the literature, together with cerebrospinal fluid abnormalities in diseases, so far as they have been studied, especially in pneumonia, scarlet fever, mumps, influenza, gastro-enteritis and rabies. They report also their personal observations, as not yet altogether completed, and analyze the accompanying tables. They are not impressed at all with the dangers that have been charged to lumbar puncture methods and say in conclusion: “(1) A review of the literature and a personal study of seventy-six cases not resulting in meningitis show beyond question that the cerebrospinal fluid often gives evidence in increased pressure, pleocytosis and heightened globulin content of a reaction on the part of the leptomeninges to the infective agents or toxins of a large number of miscellaneous acute diseases, not ordinarily causing true meningitis. (2) These diseases are lobar and bronchopneumonia, influenza, tonsillitis, the exanthems, scarlet fever, measles, variola, herpes zoster, parotitis, typhoid fever, sepsis, arthritis, pleurisy, migraine, reaction to typhoid inoculation and others. (3) The cerebrospinal fluid shows variation from the normal in about one third of the cases studied. (4) Most, but by no means all, of the patients with subarachnoid reaction have clinical meningismus (meningitis serosa—Dupré). On the other hand, many examples of meningismus are without pronounced changes in the cerebrospinal fluid. (5) The greatest caution should be used in making a diagnosis of meningitis or poliomyelitis from fever, meningismus and the changes in the cerebrospinal fluid mentioned. Cases with less than one hundred cells should be viewed with skepticism, unless clinical, epidemiologic or other laboratory evidence is decisive.”

Lenoble, E., and Daniel, F. ALCOHOL IN C. S. FLUID. [Bull. d. l. Soc. Md. Hop., Oct. 10, 1919. J. A. M. A.]

In this fifth communication on this subject, Lenoble and Daniel report that tests on eight persons demonstrated that exactly .325 gm. of absolute alcohol must be ingested before any appears in the cerebrospinal fluid. It appears first in the urine, and disappears early here. The subjects were in the hospital for white swelling, pulmonary emphysema or other chronic pathologic condition, and the alcohol was given in wine or rum. They describe further five cases in which the alcohol found in the cerebrospinal fluid gave the clue to the diagnosis. In three cases this demonstrated that the alcohol had been responsible for the fatal cerebral hemorrhage, and testified further that at least 325 c.c. of alcohol had been ingested. In another case it proved that irregular epileptiform seizures and acts of impulsive violence which had been ascribed to the underlying epilepsy were in reality the consequences of alcohol intoxication. This case suggests the necessity for revision of certain phenomena which we now attribute to petit mal. In the fifth case, mental impairment and tendency to ataxia in the man of fifty-four were explained by the alcohol found in the lumbar puncture fluid during eighteen days. When it finally disappeared from the fluid, all the symptoms subsided also, and the diagnosis was clear for the first time.

Wyeforth, P., Ayer, J. B., and Errick, C. R. CEREBROSPINAL FLUID BY PUNCTURE OF THE CISTERNA MAGNA. [Amer. Jour. Med. Sci., June, 1919.]

These investigators describe a new method for obtaining cerebrospinal fluid by puncture through the occipito-atlantoid ligament thus entering the cisterna magna. Puncture through the occipito-atlantoid ligament, they conclude, offers a convenient method for obtaining cerebrospinal fluid from laboratory animals; it has also been found more satisfactory than lumbar puncture in obtaining fluid at the autopsy table. After study of the anatomical relations of the cisterna in man, and after numerous successful punctures on the cadaver, they believe that the operation in skilled hands is a safe one for clinical use. They do not wish to minimize the possible harm which can result from such puncture; on the other hand, are convinced that the technic is not difficult and that practise upon the cadaver will be convincing on this point, without which preliminary study the operation should not be performed. Clinically, the procedure should prove useful (1) in reaching the upper fluid reservoirs of the central nervous system after blockage of the spinal subarachnoid space; (2) in combination with lumbar puncture for irrigation of the spinal subarachnoid space; and (3) in affording a method whereby specific therapy could be given more efficiently in early meningitis.

Genoese, G. CEREBROSPINAL FLUID IN INFANTILE SPASMOPHILIA. [La Riforma Medica, June 14, 1919.]

In the spasmophilic syndrome of infancy there is almost constantly increased cerebrospinal pressure due to augmentation of the spinal fluid; the albumin and chlorides are usually normal. In certain cases there is a definite acetone reaction in accord with the finding of this body in the urine. The cell count is always negative, and repeated lumbar puncture does not give constant results, although for a short time ameliorating the symptoms.

Gordon, A. H. HYDROCEPHALUS AND XANTHOCHROMIA OF C. S. FLUID. [Can. Med. Assoc. Jl., Nov., 1919. J. A. M. A.]

The syndrome of Froin consists of (*a*) a spinal fluid of yellow color (xanthochromia); (*b*) which coagulates en masse and (*c*) shows an abundant lymphocytosis. The syndrome of Nonne consists of a spinal fluid showing (*a*) marked increase of globulin, (*b*) without increase of cellular elements. The above features may be complete or partial, and variations may exist in the several factors. The syndrome of Froin, or xanthochromia alone, usually indicates an isolation of one portion of the subarachnoid space from the rest by tumor, adhesions, etc. This separation is usually found at the lower levels of the cord. Internal hydrocephalus may be associated with separation of the spinal from the cerebral subarachnoid space either by adhesions of the brain stem to the tentorium, or by hernia of the distended brain into the foramen magnum. In the case reported by Gordon the possible explanation is (1) basal meningitis (meningococcus or *B. influenzae*); (2) partial recovery; (3) obstruction of foramina in the roof of the fourth ventricle by meningitis; (4) development of a noncommunicating hydrocephalus; (5) hernia of the brain into the foramen magnum; (6) separation and sacculation of the spinal subarachnoid space; (7) development of partial Froin's syndrome lies in the separation of the sacculated portion of the subarachnoid space from the choroid plexus through which normally it is filtered and a reversion of its contents to a simple lymphoid material, yellowish, coagulating and cellular.

Deluca, H. R. CEREBROSPINAL FLUID IN INFLUENZA. [N. Y. Med. Jl., July 19, 1919.]

The findings in twenty-five cases of influenza in the patients ranging from seven to twenty-four years old, showed that in all there was an increase in the pressure. This varied considerably. Clearness and translucence of the fluid was noteworthy; in no case was turbid or cloudy fluid found. Noguchi globulin reaction was strongly positive in all. A deep canary yellow color was present, just before the precipitate was formed, and on forming the color would disappear entirely. Fehling's reaction was marked. The cell count was low. In one

patient it was over forty to the c.m.m. A predominance of polymorphonuclear cells over the lymphocytes was present. Eighteen showed positive cultures. All of these ended fatally, except one. A characteristic organism was found in the spinal fluid in a 81.8 per cent. of the cases. The organism is a bacillus, gram-negative, facultative anaërobe, nonmotile, acid producing, and forms spores.

Rovsing, C. CERVICAL RIBS. [Hospitalstidende, Vol. 62, no. 22.]

The details in four cases of cervical ribs are here reported. Neuralgias, scoliosis of the cervical spine, atrophy, and vasomotor disturbance, and aneurysm in the subclavian artery were among the common symptoms observed. He describes the technical surgical procedures of removal.

Strickler, Jr., F. P. FRACTURE OF CERVICAL VERTEBRÆ. [Kentucky State Med. Assoc., Sept. 22, 1919. J. A. M. A.]

Fractures of the cervical vertebræ constitute from 25 to 36 per cent. of all spinal fractures, and occur most frequently in the male of middle age. Several vertebræ may be fractured and dislocated at one time, but the parts most frequently involved are the body. When this is the case the fracture is usually accompanied by dislocation and compression which produce a rather sharp kyphosis. The spinous and transverse processes are also frequently the site of fracture, but in fractures of this nature there may not be much deformity. The site of these fractures, fracture dislocations and compression fractures is in the larger number of cases found in the lower cervical vertebræ. The nerve symptoms found in fracture and dislocation of the cervical vertebræ are produced by confusion or crushing of the cord at the time of injury, or by persistent compression of the cord by fragments of bone, effusions, blood clots, and later on by callus or the products of inflammatory changes.

If few or no cord symptoms are manifested, either the conservative or operative treatment may be employed, depending on which form of treatment will give the best results in the individual case. The conservative treatment is carried out by immobilizing the spine in plaster-of-Paris jackets, the Calot jacket being the type most frequently used in fractures of the cervical region. If the operative treatment is decided on, one of two operations may be used—the Albee or the Hibbs. The prognosis is guarded. In those cases in which there are marked cord lesions it is very grave, for few, if any, of these patients show improvement. The case usually terminates in death.

Brown, T. G., and Stewart, R. M. FLEXION REFLEX. [Jl. Royal Army Med. Corps., 32, 1919, No. 6.]

The phenomena of flexion reflex have not been studied with the same thoroughness in man as they have in animals. The reason for

this is the difficulty of obtaining suitable environment for observation. These authors have endeavored to carry the teaching of Sherrington further and to apply it to the human subject. They have arrived at the conclusion that under normal conditions the only portion of the receptive field that can be stimulated with effect is the area containing sensory nerve endings in connection with the foot and possibly the leg. By pressing the tendo Achilles against the posterior surface of the tibia the great toe flexes at the interphalangeal joint. At times flexion is obtained by pressure applied to the vastus externus, the vastus internus and the gastrocnemius-soleus muscles. On the other hand, when the cord has been injured the receptive field for effective stimulation corresponds more closely to that of the lower animals. The authors give examples substantiating this claim. They point out that the response in the great toe is usually extensor, but in the case of a person affected with syringo-myelia superficial stimuli applied to the sole of the foot gave rise to a flexion of the great toe, while stimuli applied to the gastrocnemius or to the postero-internal border of the tibia resulted in extension. While the flexion reflex in a normal man is very limited, in a subject suffering from a spinal lesion all or nearly all the muscles of the limb are involved. In distinguishing between the flexion and extensor relaxation it is necessary to recognize that the contraction takes place in the physiological flexors. The immediate reflex phenomena usually take the form of flexion at the hip, knee and ankle, extension of the great toe and abduction of the toes. At times the anterior abdominal muscles contract, leading to a flexion of the lumbar spine. At the same time there is crossed extension in the opposite limb. Rarely there may be crossed flexion. The movements of the two limbs are noted to be accurately reciprocal. At times no movements occur in the stimulated limb, while there is flexion after a prolonged period of latency in the other. They have observed in the case of complete division of the cord a reflex reversal. This took the form of extension in the stimulated limb and flexion in the opposite limb. Successive reflex phenomena of a distinct type were observed. They speak of this reaction as the rebound reflex. Similarly, the rhythmic phenomena which have been described in connection with the lower mammals, have been observed in man after division of the cord. The authors claim that many of the reflexes described by them have not before been noted in man, but they suggest that this is due, not to their infrequent occurrence, but to the fact that they have not been sought. They suggest that some of them may be of diagnostic significance. For example, they point out that the rhythmic alternate movements of the lower limbs in response to stimuli applied to one or both lower limbs are in fact forms of the reflex involved in progression. When they occur, it is usually possible to determine the level of the lesion. But, apart from this possible significance, the observations are of importance, demon-

strating, as they do, the fact that the flexion reflex in man is comparable to that of the lower mammals.

Galant, S. SPINAL REFLEX. [Schweiz Arch. f. Neur. u. Psych. J., Vol. 2, No. 2. J. A. M. A.]

Galant noticed that stroking along the spine of a quite young infant, held with its abdomen on his left palm, elicited a characteristic reflex movement. It is rapid, and resembles the curving of the body of a lizard as it winds its way rapidly through the grass. The infant keeps this lateral curve for a time. He examined 150 young infants and thirty-six idiots between seven and thirty years old. The spine reflex occurs more constantly in infants than the Babinski, and is stronger and persists longer. It can be elicited by stroking with the handle of a hammer or by pricking. The reflex movement is so pronounced that the infant is liable to slip off the supporting hand unless one is careful. It grows weaker as the months pass, and it could not be elicited in one seven months infant. All but one of the 105 infants presented this reflex, but only six of seventeen epileptics, and it was typical only in one in this group.

Walshe, F. M. R. THE GENESIS AND SIGNIFICANCE OF SPASTICITY. [Brain, Vol. XLII, Part I, 1919.]

This paper discusses spasticity and the functional relations of the pyramidal system in their bearings upon the principles of physiology enunciated by Sherrington. He has previously advanced evidence that there are two clinical types of spasticity, as seen in the lower limb, the extended and the flexed. The extended type, wherein the limbs lie fully extended with the feet plantar flexed, is seen in hemiplegia, or in any spastic paralysis confined to the pyramidal system. The flexed type, with flexed position and flexor spasms of great frequency and violence, is seen in severe spinal lesions. The extended type may be identified with "decerebrate rigidity"; the flexed type with the "spinal man." The extended type is not only analogous to "decerebrate rigidity," but is an expression of activity of the proprioceptive system (Sherrington) as a whole. This system induces a tonic reflex, which, unmasked in the decerebrate animal, has been shown to possess the significance of a postural reflex—reflex standing. In man, the rigidity seen in hemiplegia has the same significance. There is an anomaly, however, inasmuch as the upper limb shows an attitude of flexion, the hypertonus being resident in the flexors, not in the extensors, as in the lower limb. This may be traced to the altered functions the upper limb exercises in man and to its complete lack of the locomotor function. Walshe denies the accuracy of Förster's theory of the origin of spasticity, namely, that "the pyramidal tract exercises both excitatory and inhibitory functions," because it disregards the fundamental principals laid down by

Hughlings Jackson and Sherrington and because it is neither in accordance with those processes of reciprocal innervation which are evidenced by motor cortex reactions, nor with modern conceptions of the nature and origin of muscle tone. Reflex movements and spasticity stand in no causal relation to one another, but are both the result of loss of cerebral control over lower level reflex systems. The cerebellum may be an important link in the reflex arc, subserving the rigidity of hemiplegia. Indeed, the "complementary inverse" of spastic paralysis of cortico-spinal origin may be sought in lesions involving the cerebellum. In the production of spasticity the cortico-spinal system is supreme. The view attributing the tremor-rigidity syndrome of paralysis agitans and other organic cerebral lesions to uncontrolled cortical action is not established and is contra-indicated by such knowledge as is possessed of the normal activity of the motor cortex. Ramsay Hunt's speculations on the functions of the *corpus striatum*, Walshe holds, are quite incompatible with the facts of physiology.

4. MID BRAIN, CEREBELLUM.

Rogers, F. T. THE EFFECTS ON REFLEX ACTIVITIES OF WIDE VARIATIONS IN BODY TEMPERATURE CAUSED BY LESIONS OF THE THALAMUS. [Jl. Comp. Neurology, Oct. 19, 1919.]

Removal of the cerebral hemispheres and the thalamus in the pigeon reduces the bird permanently to a poikilothermious condition. Such an animal can be kept alive for a period of from one to three months by keeping in an incubator at 30° C. The subsequent behavior and reflex activities vary as the body temperature varies. Typical decerebrate wandering movements occur when the animal is hungry if the body temperature is above 36°. If the body temperature is allowed to fall to 30°, disturbances of equilibrium appear, ushered in by the appearance of a tonic flexion of the leg and foot muscles. At 24° or less, the bird is unable to stand or fly. The eye reflexes, pupillary and nystagmus, disappear at about 30°. All reappear when the body temperature is brought back to the normal of 40°. Detailed physiological observations of a bird after ablation of all the brain anterior to the posterior commissure and the optic chiasma followed by microscopic study of serial sections of the remaining parts of the brain stem. [Author's abstract.]

Stafford, C. M. ENCEPHALITIS LETHARGICA. [Journal of Laboratory and Clinical Medicine, August, 1919.]

The author reports a case of encephalitis lethargica in a man complaining of great languor and pains in the arms and chest. Laboratory examinations of blood and urine were negative, but the interest in the case lies in the fact that a gram positive diplococcus frequently occurring in short chains of three or four loosely joined cocci was isolated in pure culture from the spinal fluid on two successive withdrawals.

Three spinal punctures were made, following each of which the patient's condition was temporarily improved.

Siemerling, E. EPIDEMIC OF ENCEPHALITIS. [Berl. klin. Woch., June 2, 1919.]

In a short and direct article Siemerling describes the symptoms observed in a small group of patients admitted at the Kiel clinic. There were nine men and six women. The outstanding features of the epidemic was the preponderance of mental symptoms in the early stages. This led at first to the diagnosis of a severe neurosis or psychosis; and it was not till the appearance of somatic neurological lesions that this impression was revised and encephalitis was diagnosed. A conspicuous feature was bilateral ptosis, with nystagmus and slow reaction of the pupils. Delirium, as well as drowsiness lasting several days, was a common feature. In one patient a condition suggestive of severe chorea was observed. Several of the patients had recently suffered from influenza, but the symptoms he thought were not characteristic of the sequels of influenza. He also excluded syphilis, as Wassermann's reaction was invariably negative. Lumbar puncture, showed increased pressure (140-200) only in three of his cases. The examination of the fluid showed moderate lymphocytosis. Four of the patients died. In one of these cases the autopsy showed disseminated meningo-encephalitis. The author concludes that the disease was acute primary hemorrhagic encephalitis, and that it may belong to the type associated by v. Economo with a diplo-streptococcus. Lumbar puncture did not prove very effective in relieving the symptoms, and the most beneficial remedies were rest in bed, ice-bags, sudorific treatment, aspirin, and digalen.

Muskens, L. J. J. RESEARCH REGARDING THE PHYSIOLOGY OF THE FORCED MOVEMENTS OF EYES, HEAD AND TRUNK AND THEIR ANATOMICAL SUBSTRATA. [Brain, 1914, pp. 352-427.]

Although it has been clearly demonstrated (*e. g.*, Journal of Physiology, 1904, p. 204), that in these movements only the direction of the locomotion is changed, yet regularly theories are submitted holding that hypotony or paresis of one half of the body may lie at the bottom of these phenomena. For all bilateral symmetrical animals three forms of forced movements must be considered, being performed in three planes, all perpendicular to each other. The most common forms are rolling movement (being a locomotion in a plane, perpendicular to the long axis of any such animal), and circus movement (being a locomotion in the horizontal plane). A research was carried on in cats, aiming at the physiological analysis of the ascending secondary nerve-tracts from the vestibular nuclei, running up in the area of the posterior longitudinal Fascicles and its lateral wings (Fasc. Deiters Ascendens). A lesion of the innermost bundles results in forced movements in the horizontal plane, with conjugated deviation in the same direction as the circus

movements. Severance of the outermost bundles resulted in rolling movements (compare the arrangement anatomically and physiologically in figure (Fig. 14 in *Brain*, 1914, p. 404, and p. 54 of the abstract)). So an ascending degeneration of the right vestibulo-mesencephalic bundle is accompanied by circus movement to the left; this same circus movement is also brought about by a lesion of the region of the posterior commissure, causing descending degeneration of the left commissuro-medullary bundle. The study of the lesion on the oral side of the posterior commissure (connecting the supranuclear vestibulatory centers with the corpus striatum) throws light on the forced movements and positions that are seen in cases of apoplexy (conjugate deviation of head and eyes), and the peculiar vestibulatory disturbances that accompany tumors of the frontal parts of the proven cephalon. [Author's abstract.]

Frets, G. P. ANATOMICAL FINDINGS IN THREE CASES OF CHRONIC CHOREA AND ONE CASE OF PARALYSIS AGITANS. [Psychiatrische u. Neurologische Bladen, 1918 (Feestbundel Winkler), 19 p.]

There is a progressive atrophy of the weight of the brain (Table I). Table II contains the measurements of the corpus striatum in ten cases of different diseases on frontal coupes. Table III gives the measurements of the frontal coupe through Monro's foramen in seventy cases of different diseases (men and women) and in the four cases of chronic chorea and paralysis agitans. It appears that the three cases of chronic chorea differ very little from each other. The nuclei caudati (1.1—0.9 cm. \times 0.3—0.4 cm.) are much smaller than the normal n. caudatus, smaller than the n. caudatus from all the cases of Table III (dem. senilis, dem. paralytica, dem. præcox). Putamen and globus pallidus are also smaller.

From the case of paralysis agitans the globus pallidus alone is smaller.

Microscopically no hemorrhages were found in the three cases of chronic chorea. In the case of paralysis agitans many hemorrhages were found; f. i., a large old focus in the caput n. caudati.

The histopathological method of investigation (Nissl, Bielschowsky, Cajal, Weigert-Pal, Van Gieson) did not show findings for one region only. There are pathological findings in the cortex and also in the basal ganglia. There are found many corpora amylacea and chorea-corpora in the neighborhood of the vessels of the basal ganglia.

In a fourth case of chronic chorea the measurable atrophy of the corpus striatum is also found. In a second case of paralysis agitans no atrophy was found. Both cases of paralysis agitans showed arteriosclerosis. Probably both these cases are a symptomatic form (arteriosclerosis, hemorrhages) of paralysis agitans, whereas the four cases of chronic chorea are the essential form of this disease. [Author's abstract.]

Obituary

PHILIP COOMBS KNAPP

With the death of Dr. Philip Coombs Knapp on February 23, 1920, we witness the passing of a man of great and various talents, and one of the most conspicuous and well known men of the world in his chosen field of medicine. At the meetings of the medical societies of which he was a member, and especially at those of the American Neurological Association, where he was a most regular attendant till failing health made the journey too great a task for his strength, his figure, quite rotund but always exquisitely attired and fastidiously groomed, was a very familiar one, as he rose to take part in the discussion. Many of us, his colleagues, will remember him best in this aspect, as, with well-chosen words, he added something of importance to the statements of the paper just read, or by some incisive criticism pointed out some faulty reasoning or neglect of fundamental fact by the unlucky author, in both ways showing the wide learning and firm grasp of his subject of one who was a master.

Philip Coombs Knapp was born of New England stock in the city of Lynn, Massachusetts, on June 3, 1858, the son of Philip Coombs and Sally Harriet (Moore) Knapp. His education was of the best obtainable. After attending the Lynn High School he graduated from Harvard College in 1878 with the degree of A.B. at the early age of twenty, among the youngest of his class. He then studied medicine at the Harvard Medical School, receiving the degree of M.D. and also that of A.M. in 1883. He also served during these years as house officer at the Boston City Hospital, with which he was afterwards for so many years associated, and at the Boston Lunatic Hospital at that time situated in South Boston, but later moved to Boston proper, and now, under control of the state, known as the Boston State Hospital. A period of study in various cities in Germany and in Vienna completed his medical preparation, and in 1884 he returned to Boston and began the active practice of his chosen specialty of nervous and mental diseases, in which he had already had special training. Recognition came promptly, as he was appointed assistant physician for diseases of the nervous



PHILIP COOMBS KNAPP

system at the Boston City Hospital on April 22, 1885, and promoted to physician in the same department on January 20, 1886, a position which he still retained, and in which he was active, even up to the time of his death. In addition from 1886 till 1888 Dr. Knapp was neurologist to the Boston Dispensary. He filled many other positions besides, being a trustee of the Boston Insane Hospital from 1897 till 1902, and consultant to the Massachusetts State Hospital for Insane Criminals from 1895 till his death. Dr. Knapp was instructor for diseases of the nervous system at the Harvard Medical School from 1888 to 1913, when he resigned. He belonged to numerous medical societies, and had served as president of the American Neurological Association in 1895, of the New England Society of Psychiatry from 1905 to 1908, and of the Boston Society of Psychiatry and Neurology in 1901. Nor was the recognition of his worth confined to his own country, as he was honored as few American physicians have been by being made a member of the Neurological Society of the United Kingdom, and a Fellow of the Royal Society of Medicine. Aside from these societies which have just been mentioned Dr. Knapp was a member of the Massachusetts Medical Society, the Massachusetts Medico-Legal Society, the American Institute of Criminal Law and Criminology, the American Association of Medical Jurisprudence, the American Medical Association, and the New York Society of Psychiatry.

Always a great student, Dr. Knapp accumulated a large library, not only in his specialty in medicine, but also in other fields as well. Knowing books well, he used discrimination in their selection with the result that many of his books were included in the lists of rare books in private libraries published by larger libraries for the guidance of students and scholars. His careful study of the literature of neurology which was one of the marked characteristics of Dr. Knapp showed in his writings, which were always prepared with care, and not only presented his own studies of disease, but also his views compared with what had been done in the subject by others, including foreign writers, for Dr. Knapp was an accomplished Italian scholar, and in addition knew both French and German well, and could use other languages to some extent. This careful work in his medical writings resulted in the author becoming very widely known by the leaders of the medical profession everywhere, and one can hardly look through any article or book of any authority published in either English, German, French or Italian without finding some reference to Dr. Knapp's writings. Dr. Knapp published a small book, the Pathology, Diagnosis and

Treatment of Intracranial Growths, in 1891, and wrote the chapter on Nervous Affections Following Railway and Allied Injuries for Dercum's Textbook of Nervous Diseases in 1895, as also the one on Feigned Diseases of the Mind and Nervous System in Hamilton's System of Legal Medicine in 1894. His most important contributions to neurology however are to be found in very numerous articles published by him in the medical journals, and a review of the files of the JOURNAL OF NERVOUS AND MENTAL DISEASE will show a considerable number contributed to this journal.

In wider fields than that of neurology Dr. Knapp has left his mark. The notes written by him in his translation of Strümpell's Textbook of Medicine in the four successive editions in 1887, 1893, 1901 and 1911 show the wide range of his knowledge of other fields in medicine, while the fact that he was a councilor of the Dante Society from 1881 to 1902 shows in what esteem he was held by Dante scholars.

Dr. Knapp for many years was a well-known figure in the courts, appearing as an expert witness in cases involving mental and neurological knowledge, and his testimony was always consistent, clearly and logically given, and universally carried much weight.

With the scholarly characteristics possessed by Dr. Knapp supplemented by his wide reading and remarkable memory, as well as his very large clinical experience, one would have expected him to excel as a teacher, and to a certain extent this was the case, for those who studied under him always profited by the work. However expecting from others the same careful attention to details which he himself gave he was never a popular teacher, nor one to inspire enthusiasm in any large number of students, but to the real student, and the select few who were fitted to profit by his wide knowledge, he was a most stimulating teacher. In his ordinary hospital work he seldom gave the house physicians much of his views of cases unless they were interested enough in the problems presented to them in their daily work to ask questions, when some of the store of knowledge of their chief would be clearly presented to them, a certain natural reserve showing in this way in his relations to those working under his direction.

The writer who has been associated with Dr. Knapp for many years in his hospital work, and who has therefore known more of this part of his work than almost anyone, could not, if he would, pass over his services in this capacity without a word of recognition of the faithfulness and devotion as well as skill which he brought to it, during his service of nearly thirty-five years as physician in the

department for nervous diseases. At the beginning of this association, when the work of the neurological department of the Boston City Hospital was confined to an out-patient service with a consulting service to cases in the hospital, the records of the department were very inadequate, but when Dr. Knapp appeared at the beginning of his term of service it was always with boxes under his arm containing complete records of all cases seen by him at the hospital, and this system of private records of his hospital cases was only given up after fully adequate records under a good system had been developed for the hospital. Many times Dr. Knapp has been known to tell some physician anxious to have him see some case in consultation that he must get someone else to do this, when the hospital work was the only reason for the refusal to go.

The development of the neurological department of the City Hospital to a house service of over fifty beds, and a whole ward fitted with everything for the modern treatment of excited cases, was largely due to the persistent efforts of Dr. Knapp, who felt very strongly that mild mental cases should be treated in a general hospital, at least until it could be decided whether the cause was a removable one, or until the need for commitment to a hospital for the insane could be determined, and this constituted both a service to the public, and a demonstration of the feasibility of the plan.

Nor should we omit to note the truly patriotic service of Dr. Knapp during the war which has so recently ended. Though prevented by age, and a partial paralysis from which he suffered, from engaging directly in war work he nevertheless, in spite of failing health, kept steadily at his hospital work, and not only did this, but shouldered the work of colleagues who were absent in the military service, and this with no word of failing strength or increasing difficulties. This silent service in carrying the burdens of those who had left their work to enter the service of the country, of fully as great service as more active war work, receives too little attention, and when done in the face of such difficulties as in the case of Dr. Knapp can only command our silent respect and appreciation.

Dr. Knapp, as was perhaps not surprising in one who was so much the student, did not marry till rather late in life, and it was on December 12, 1893, that he married Mrs. Isabel Williams Stebbins, of Springfield, Massachusetts, who with several children by a previous marriage survives him.

Personally perhaps the most striking characteristic of Dr. Knapp was his reserve. He seldom talked freely on many subjects, even

with his intimate friends, and practically never on personal matters. Although it was almost never suspected from the frequency with which he took part in discussions at meetings, both on medical and business matters, he was troubled greatly all his life by shyness, though this wore off to some extent in the course of time, nevertheless he has admitted that it always required an effort of will for him to rise to speak in public, and this effort probably accounted in large measure for a certain abruptness in manner in debate, which at times seemed almost like aggressiveness.

Like almost all men of great reserve it is true that Dr. Knapp had quite another side to his character, from that of the learned and skillful physician and student, which was only appreciated by his intimates, and few of those, that is a keen sense of humor, and a capacity for comradeship that was entirely unsuspected by most of those who knew him. His devotion to his patients won him the affection of many of them, not only through what he was able to do for them in their suffering, but because of his frequent great kindness to them.

JOHN JENKS THOMAS.

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Original Articles

THE GERMAN INSTITUTE OF PSYCHIATRIC RESEARCH

BY PROFESSOR DR. EMIL KRAEPELIN

OF MUNICH

The havoc the world wide war has wrought among the best and sturdiest of our fellow citizens admonishes us to do everything possible to avert the harm which threatens the future of our nation through the reduction in the ranks of its noblest sons. Among the many enemies with whom we have to contend *diseases of the brain* stand almost in the forefront, for they always involve very grave troubles which in countless cases lead to pronounced invalidism, and often even to a fatal outcome. In far-reaching measure these diseases destroy the very substance of human personality, make it impossible for the sufferers to act rationally, make them helpless and quite often dangerous to themselves or to their environment. As a result at least half the patients must have special care in asylums for years or even for the rest of their lives. This makes them a hardly supportable economic burden for their families and for the communities on whose support they depend. Besides they very often have a tendency to transmit their affliction to their children, so that their baneful influence affects coming generations in a way that is at times most pernicious.

It is not easy to gauge the injury done the public weal by mental diseases. We may assume that *in Germany of every five hundred inhabitants, one requires treatment in an asylum and that the total number of insane persons is at least twice as large.* Thus we certainly have to deal with more than a quarter of a million persons who are more or less spiritually crippled or wrecked. In

addition to these there is an uncontrollable number of persons who have no pronounced disease, but who are either degenerate, nervous, unbalanced or depraved; they either engage the attention of the police and the courts as criminals, tramps or prostitutes, or else their inability to cope with the demands of life makes them a source of unhappiness to their families. It is doubtful whether the figure cited above actually covers the case, especially when we recall that the number of mentally disturbed persons who require asylum treatment increases very rapidly in all countries which provide for the systematic care of the insane, and that statistics gathered in smaller communities where great accuracy was possible have in part shown frightfully high results—results that are twice, nay, four to five times as high as the figures we have estimated.

With regret we must admit that we are very inadequately equipped for the fight against the dangers which menace our nation's health.¹ In the course of the last century, it is true, our care for the insane has made great progress and has now reached a point where we may say that what we are striving for has at least in principle been reached. But we must not close our eyes to the fact that our splendidly organized asylums can, in the great majority of cases only preserve the spiritual wrecks that survive the effects of insidious disease. In other cases the physician can at least create conditions favoring a complete recovery, but our science is only quite exceptionally able to intervene directly and thus actually to cure a disease. Our function as physicians is in large measure rendered ineffective by our *ignorance of the origin and nature of mental diseases*. We know the causes that lead to certain diseases without however being able to eliminate them. Moreover the task of combating some of the most important forms of insanity involves activities quite beyond the sphere of the physician. In these cases we could only hope to be successful if it were possible by means of extensive propaganda to secure an assured basis for the coöperation of wide circles and especially of the law making bodies (legislature).

An examination of the conditions which at present surround psychiatric research will promptly show that they preclude a satisfactory solution of the problems which confront it. It is quite natural that insane asylums are primarily arranged to meet the requirements of medical care. For purely scientific work, they do not, save in most exceptional cases, dispose of investigators who are free to devote themselves to research, nor of the assistants, laboratories and other resources needed for exhaustive research work.

¹ See Kraepelin, 100 Jahre Psychiatrie, etc.

In addition to all this the increasing number of huge asylums and their unfavorable provisions for advancement have rendered a career in such institutions much less attractive to men of independent scientific attainments. In clinical institutions conditions are no doubt more favorable owing to the influx of eager students and to their being in closer touch with general medical science. But here too teaching, examinations, administrative work and the treatment of the patients are oftentimes such a burden for the directors that their research work must perforce be much hampered even when they do not, from the outset, prefer to use their position as a stepping stone to an extensive private practice. Considerations as to the prospect of making a successful career almost always prevent the younger assistants from so consistently devoting all their energies to a specific field of research as the great scientific problems imperatively demand that they should. Besides these younger assistants generally receive wretched pay, hardly have leisure for their own work, leave their positions after a few years and have at their disposal only the meager means and material which a penurious government can grant for the luxuries of science and which are left over for their use after the needs of their chief have been met.

When, under such conditions, we have to face the enormous task that science sets us, it is not surprising if a feeling of helplessness overcomes us. What we need is a practical division of labor and subsidies that are at least somewhat commensurate to the demands made upon us. The domain of psychiatry is already so large that it is quite impossible for a single individual to master the auxiliary sciences whose range is often so wide apart. Hence it is most important to secure eminent investigators for all the branches of science upon which the solution of psychiatric problems depends. And these investigators must be so situated that unimpeded and free from material cares, they can devote their entire energy to their special life's work. The conditions under which they are to work must be as favorable—ample and suitably equipped laboratories, every kind of scientific material, capable assistants and funds sufficing for the purchase of the numerous and manifold kinds of apparatus without which work in the natural sciences is impossible nowadays. All these conditions can only be realized in special research institutes which serve no other interests and are so endowed that sums vastly in excess of what we have been accustomed to spend for scientific work in our special field are available.

The foremost task for such a research institute would be to *make clear the nature and the sources of mental disturbances*, and

then to discover ways of preventing them, healing them or making them easier to bear. How intimately these two fields of research are related is best shown by the example of *syphilis*. We had long known that all kinds of serious nerve and brain troubles may follow in the wake of this disease, but it is only within the last few decades that we have recognized with increasing certainty that the most dreaded form of insanity, known as softening of the brain, occurs *only* as a consequence of *syphilis*, though as a rule there is an interval of eight to fifteen years between the two diseases. The recognition of this fact and the final confirmation afforded by Wassermann's reaction suddenly gave our methods of treatment a definitive turn. It must, however, be admitted that treatment which is effective in other forms of syphilitic disease has failed when applied to softening of the brain. Still we have gained a quite definitive viewpoint for further effort in this direction and we may hope that, sooner or later and by more or less circuitous routes, it will bring us nearer our goal. But above all we know that softening of the brain can be forestalled by the avoidance of syphilitic infection, and perhaps also by very prompt and thorough treatment.

Now that Wassermann's reaction has made it possible to trace the devious paths of the germ which causes syphilis, we find its range much wider than we could formerly have suspected. Not only affections of the heart and of the larger vessels, but also quite a number of diseases of the brain which it was customary to ascribe to overexertion and to strenuous life, are, as a matter of fact, due to syphilis. But it is steadily becoming clearer that many forms of infantile imbecility, of physical and mental incapacity, as well as of deficient moral strength may be due to injury and disease of the embryo brought on by syphilitic infection of the parents. Careful and thorough study of these influences opens a promising prospect for proper treatment and above all for prophylactic measures.

The causes that lead to those mental diseases which are superinduced by the consumption of poisons like alcohol are much clearer than those which lead to syphilis. But here also many an important problem awaits its solution. It was long before we had gained reliable information about the influence of alcohol on the mental faculties, an influence which is partially obscured by curious forms of self-delusion. Our knowledge of the changes in the mentality that are brought about by the consumption of other poisons is very meager. In several forms of mental disturbances due to alcoholism the causal connection with the poison needs explanation, for it seems as though hitherto unknown factors play a part here. Possibly

psychological experiments and examination of biochemical changes may throw some light upon this question. In its battle with alcohol and other poisons, as well as against syphilis, science has a further duty, namely, to use the results of its researches for the greatest possible enlightenment of the masses. It is only in this wise that we can secure the legislation that will help us in our effort to counteract two of the most widespread outward causes of insanity.

Unfortunately we have as yet not been able to take the first step toward an effective cure of several of the most prevalent and severe forms of insanity, because their nature and the causes from which they arise are wholly unknown. This is especially true of *dementia præcox*, which is responsible for the majority of cases of progressive dementia and of epilepsy. In a certain sense the same may be said of the very frequent cases of maniacal-depressive psychosis which have as their concomitants states of violent excitement and particularly of melancholic depression. To cast light into the darkness which still enshrouds these forms of disease must be the chief aim of psychiatric research. In addition to the anatomical determination of the more delicate changes in the brain and the gathering of data about heredity and prenatal infection, we shall probably have biochemical research as an aid in this work. With the aid of serology, a science that grew out of the investigations regarding immunity and which is beginning to throw light upon the complicated vital processes of the blood and of the vascular system, we may possibly be able to penetrate into these fields as well. Much attention has been bestowed upon disturbances of the inner secretion caused by cessation of secretion of the inner glands or by the occurrence of morbid changes in these secretions. The discovery that cretinism is caused by interruption of the functions of the thyroid gland and the surprisingly successful cures growing out of this discovery constituted the alluring example which led scientific thought into this channel. But it is hardly probable that we can hope to trace an equally simple connection between cause and effect in other diseases. Still it is indisputable that certain gland-like formations have a most decisive influence on our mental development and that we have every reason to study such questions, particularly with the help of vivisection.

Degeneration presents another large field for research. Though we know in a general way, that the inheritance of undesirable qualities may result in a deterioration of the human race, we are as yet ignorant of the precise conditions under which mental shortcomings and morbid tendencies are transmitted. Hence we also lack reliable

guidance for our efforts to choke this source of degeneration. The general question of the origin of inheritable deficiency and of unfavorable tendencies seems even more important. In this connection we should above all study the baneful prenatal influence of poisons like alcohol, of disease germs, sickness and of unfavorable environment. That these factors may cause a general deterioration in future generations is certain, but we do not know whether or in how far they are responsible for certain hereditary predispositions to disease.

In the question of degeneracy the gathering of statistics is a most important aid, but it is an aid with which it is not easy to deal. The mental state of a nation is reflected in an endless series of phenomena, many of which can be registered with the help of statistics. In addition to the recording of the prevailing mental diseases and to a census of the persons afflicted with mental weakness and disease, of epileptics and deaf-mutes, we have of course further indices for judging the mental status of the nation, in the frequency of suicide and crime, in the prevalence of tramps and prostitutes, of alcoholism and syphilis, and in the proportion of children fit to go to school and of young men fit for military service. But it is also clear that close observation of every possible other form in which the will of the masses finds expression may help to complete the picture, *e.g.*, marriages, the number of children, migration to the cities, economic development, religious, political and artistic tendencies, literature, the effects of education and culture, and many other factors. We shall also have to consider every fact that throws light upon the physical capacity of the nation, upon infant mortality, upon the age at which mortality occurs and upon the frequency of epidemics.

It is, of course, a tremendously difficult task, but at the same time a splendid one carefully to sift the mass of data which such a census presents and to construct a general picture of the folk-soul out of those traits in which its manifestations are best discernible. Were it possible to perform this task in a really reliable manner and so to gain insight into the changes that are constantly taking place in the mentality of our nation, we could be able to answer the much debated question of our future development—the question whether degenerative or regenerative processes predominate in the body politic and whether we are advancing or retrograding. We would also be able at times to discover the gradual growth of menacing symptoms in certain phases of life, to take the necessary preventive measures and to observe their effectiveness. The solution of all

these problems is conditioned upon thoroughgoing study of the circumstances in which abnormal soul conditions originate.

It would be useless to enumerate how many possibilities a group of capable and amply endowed psychiatrists might find to work for the weal of our people. It is a peculiarity of science that each new discovery infallibly raises new questions which no one can foresee. Fifty or sixty years ago hardly any one thought of getting other information about insanity than could be gained by superficial observation of the afflicted. At all events, scientific laboratories for such a purpose did not exist. About forty years ago the first occasional attempts were made to examine with the aid of microscopical sections the changes occurring in diseased brains, but it took many years before the first practical results could be made known. Still later came the first attempts to use psychological experiments—as developed chiefly by Wundt—in connection with psychiatry. In the last two decades one has resorted to exact biochemical examination of mentally diseased persons. Recently, and especially since the discovery of Wassermann's reaction, serology has also been enlisted in the service of psychiatry. Efforts are also being made to bring the former inaccurate observations about heredity into harmony with the views of modern natural science. Thus in the course of half a century a large group of auxiliary sciences has come to the aid of simple observation and each of them proceeds on its own way and with its special resources toward a common goal. Scientific problems have multiplied and have grown vastly more complicated than one could have anticipated. Hence their solution now calls for a whole staff of independent investigators, men trained in quite divergent directions, whereas not more than fifty years ago our only source of knowledge consisted in the close observation of the changes occurring in the state of the patient or possible in the clumsy dissection of a diseased brain.

The account I have given shows that the lines on which our science has developed necessarily call for the establishment of a research institute and Munich seemed a favorable place for this venture. Aside from the fact that a considerable sum of money was forthcoming in this city, it was possible without special difficulty to find a temporary home for the institute in the Psychiatric Institute, equipped as it is with numerous scientific laboratories. Furthermore there exists the possibility of later on coming into close relations with a new admission hospital for the insane which the city of Munich proposes to build. And this opens the prospect that at a not too distant date the institute may have a new and well

equipped building of its own on a site that has already been granted by the city.

These are the auspices under which the institute began its work on April 1, 1917. It started with five departments, three devoted to the various branches of anatomical work and one each to serology and demographic-genealogical research. After the war is over it will probably be feasible to establish a department of chemistry and one of psychology. For the existing departments we have secured the services of distinguished scientists. They enjoy complete independence and have the same rights as other Bavarian officials. As the research institute is affiliated with the university, the heads of departments are all members of its teaching staff, but their university work is subsidiary. Scientific research and the gaining of collaborators to solve the problems it presents are their exclusive field of activity. With a view to inducing as many young and ambitious men as possible to work in the research institute, provision has been made for a number of laboratory places and more are projected. We have suggested to all such corporations in the various German states as have to provide for the care of the insane that they pay an annual rental of 2,000 Marks per laboratory table and appoint suitable candidates. It is pleasant to be able to report that notwithstanding the heavy burdens imposed by the war, twenty such corporations have already agreed to pay for tables, in whole or in part. This insures the healthy growth of the institute and brings it into most desirable relations with German insane asylums. The latter will in turn, as we hope, derive helpful suggestion and professional satisfaction from the scientific work done in the institute. The founders and the Kaiser-Wilhelmsgesellschaft which grants us an annual subsidy are also to have the right to appoint candidates.

Thus everything points toward a satisfactory development of the research institute, but it would be a mistake to think that we shall soon or without great toil garner the fruits of the work now initiated. Untiring and long collaboration on the part of all concerned will be necessary ere we can gradually penetrate the deep mystery which still enshrouds the greatest part of our branch of science. But if we are ever to accomplish this task it can only be done by pursuing the course upon which we have now started. We must enlist every conceivable scientific help and place it in the fullest measure at the service of the work of research. In addition to the installation and up-to-date equipment of the projected research departments and of such further ones as may be necessary we shall

require a library which ought to be as complete as possible and include all auxiliary sciences. The generous gift of the very valuable and precious library of the late Geheimrat Lähr-Zohlendorf supplies a good foundation upon which to go on building. Later on we shall also have to think of providing certain specially gifted younger scientists with more amply endowed opportunities for work, of gaining further suitable collaborators, of stipends and means for scientific journeys and investigations in foreign countries.

Of course much more money than we now dispose of would be needed to carry out such plans as these. But one thing is certain—that the cost for a most completely and amply equipped research institute would amount to a mere fraction of the 200 million which the care of the inmates of asylums, most of whom are incurable, annually consumes. If our work is not quite futile and if in the course of time it brings about an appreciable reduction of this financial burden, we shall be amply rewarded for the outlay incurred. We must not forget that even with niggardly financial resources and under most unfavorable outward conditions our science has made notable progress and has gained important viewpoints for the prevention and treatment of several forms of insanity.

Unfortunately we shall never be able to count upon the state, hampered as it is by tax considerations, to grant us funds for a research institute of a large scale. Private endowment must be secured, just as it was secured for other research institutes, some of which, notably in foreign countries, have vast sums at their disposal. Possibly this method of founding institutions is better for their healthy growth, as it gives them greater latitude. Our own experience has shown that even under the limitations imposed by the war, it was possible to found an institute for psychical research, however modest in its dimensions. The necessary funds were raised in less than two years. We may even hope that the experience gained during the war will popularize the thought that one ought generously to support all efforts to strengthen the mental and moral health of the nation. Those who have in their own environment had occasion to observe what mental disturbances and disease mean for the patient and his family will certainly do everything in their power to help check the flow of this too abundant source of human suffering. But even those who have not been personally affected by such misfortune, cannot fail to see that we have to deal with questions and aims that are of supreme importance for the future of the race.

A CASE OF DIFFUSE CEREBRO-SPINAL SCLEROSIS

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INTRODUCTION

Since Kelp (1871) and Schuele (1872) reported certain cases under the title *diffuse sclerosis* a great many have been described by different authors. Among these, Strümpell and Heubner were the first to describe the clinical symptoms and the anatomical findings more thoroughly than the preceding authors and to give a certain definition to this disease. According to these authors, diffuse sclerosis is characterized by a rapidly progressing mental deterioration and a peculiar spastic condition of the muscles of the body. Anatomically an abnormal increase in consistency of the medullary substance as a result of proliferation of the interstitial tissue was noticed.

As to the etiology of this disease, the opinions of the different authors vary greatly. Most writers seem to believe that diffuse sclerosis is, in reality, the terminal stage of a number of different diseases. Some of them are probably of a syphilitic nature, while others are possibly in the advanced stage of disseminated sclerosis. The discussion as to the genesis of the pathological changes is not exhausted. It is to be decided, if these changes be exogenous or endogenous in character, and what relation exists, if any, between the changes on the nervous parenchyma and those of the interstitial connective tissue element.

Thus the etiology and the genesis of this condition is not settled in spite of the large amount of research on the subject.

The following is a case of diffuse sclerosis showing very unusual clinical manifestations and very peculiar pathological findings:

ABSTRACT OF CLINICAL OBSERVATIONS

Preceding the mental disturbances, which occurred eighteen years before her death, the patient had a "shock," followed by eight weeks' aphasia. Upon recovering, there was no apparent speech defect. She limped somewhat. She was committed to the Worcester State

Hospital when she was thirty-eight years of age, showing manic exhilaration. She stayed there seven years, during which time she manifested the alternating periods of excitement and depression. She was diagnosed as a typical case of manic depressive insanity. She showed, however, some impairment of the memory and poor insight as to her condition even in time of remission. The patient escaped from the Worcester State Hospital and was admitted to this hospital when she was forty-eight years of age. When admitted she presented a slight asymmetry of the face and evidence of mitral regurgitation and hyperactive reflexes. The Wassermann test of the blood serum was positive. Mentally, she still showed alternating excitement and depression and was considered to be a manic depressive case. But in a number of years she became gradually demented. From her forty-sixth year she had a number of fainting spells with short periods of unconsciousness. She gradually weakened and became rather indifferent and apathetic. From this time she was considered to be tuberculous and was cared for in that building, being in bed all the time. When about forty-nine years of age she was markedly demented, helpless and was suspected of general paralysis. The examination of the spinal fluid was negative. She failed progressively both mentally and physically. She became disoriented and apathetic. She died in this condition, eighteen years after the onset of the mental disorder. In this manner the clinical condition of the patient swayed from typical manic depressive to a suspicion of general paralysis, dementia præcox and possible epilepsy.

POSTMORTEM OBSERVATION

Autopsy twelve hours after the death. The anatomical diagnoses are as follows: Well developed and nourished (body length 156 cm., body weight 40 kg.); uterus sinistrotorted; high placing of the left tube and ovary; fibrous adhesive pleuritis of both sides; chronic vegetative endocarditis; congestion of the inferior lobe of the right lung; beginning sclerosis of the aorta; chronic diffuse nephritis; fibroid of the uterus; a small ovarian cyst; catarrhal cystitis; etc.

Description of the Brain: The calvarium is thick and heavy. The grooves of the meningeal vessels are shallow. The dura is not thickened but is slightly adherent to the pia mater. There is some subpial edema and milky of the pia mater. The vessels over the entire brain are injected. The basilar artery is slightly sclerotic. The brain is remarkably small, weighs only 870 grams.

Pituitary Body and Spinal Cord: Not remarkable.

The brain was carefully examined after two weeks' fixation in

10 per cent. formalin. Both hemispheres are about the same size; measuring 15 cm. in length, 5.5 cm. in breadth, 6.5 cm. in height. The convolutions of the cerebrum do not appear atrophic, though they are apparently simpler than normal. In the middle part of the

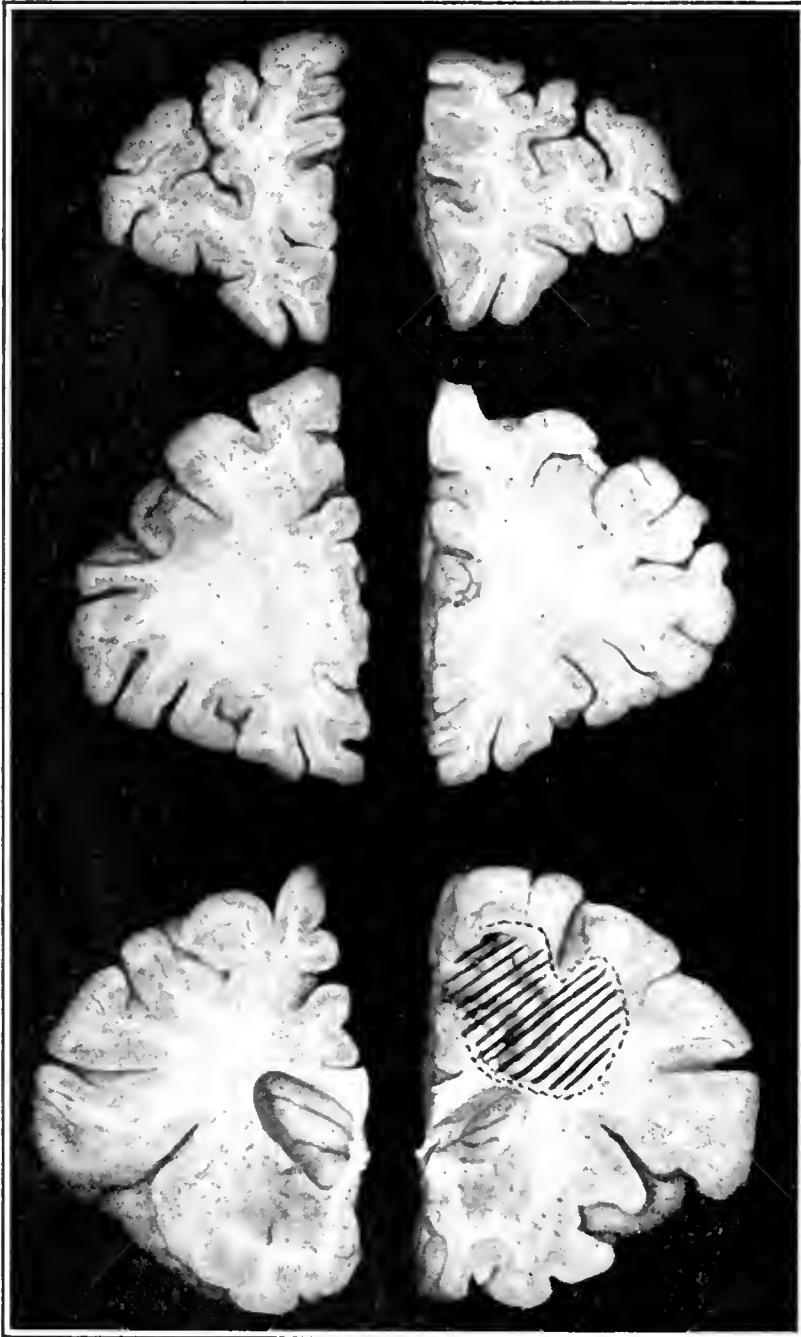


FIG. 1. Striated part shows cyst and softening.

right, first frontal convolution, chiefly on the medial aspect, there is a cyst as large as the tip of the small finger (Fig. 1). The wall of this cavity is smooth, white in color and not pigmented. The second frontal convolution at the junction to the anterior central convolu-

tion is very narrow and soft to the touch, indicating a softened area inside of this part. Otherwise, the brain is unusually firm in consistency and gives the feeling described as "lederartig."

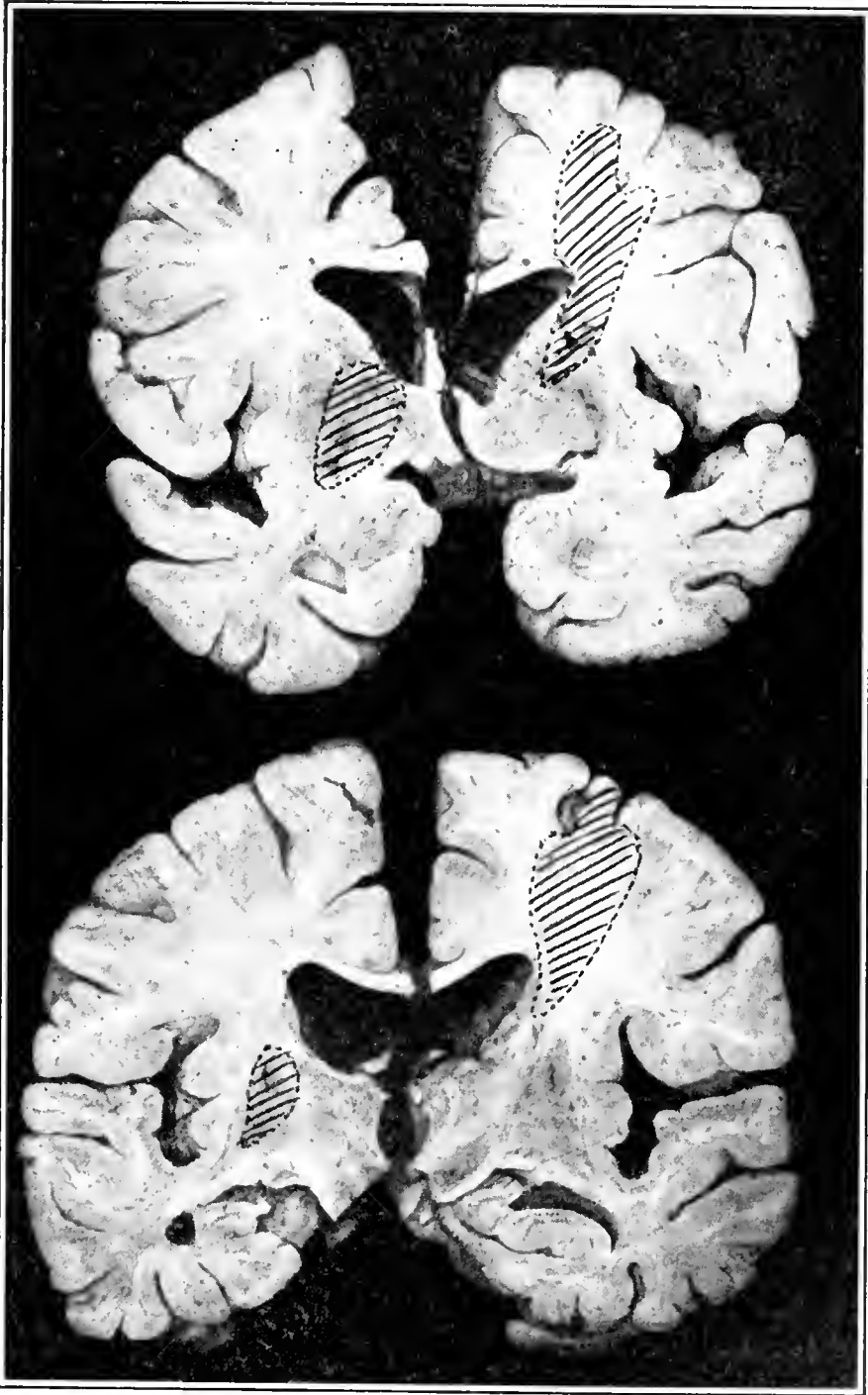


FIG. 2. Striated parts show cysts and softening.

Examination of the Cut Surface (Figs. 1 and 2): Beginning from the cyst of the right first frontal convolution and ending at the above-mentioned softened area of the right second frontal convolu-

tion, the larger part of the centrum semiovale of the right side is softened. This softening involves a part of the internal capsule, and on the cut surface through the precentral sulcus, there is a small cyst in the internal capsule (Fig. 2). The internal capsule and an adjacent part of the lenticular nucleus of the left side is also the seat of the softening, which appears somewhat brownish yellow in color.

Except in these softened areas, the white substance of the brain feels uniformly firm. The ventricles are not dilated. The ependyma is not granulated.

Sections of the brain stem reveal some softening and small cysts in the pons on each side, between the pyramidal tracts and medial lemniscus.

MICROSCOPICAL FINDINGS

The vessels of the pia mater show thickened walls and some regressive changes. Here and there a slight infiltration with lymphocytic cells is observed. No plasma cells are found even by careful examination with Unna-Pappenheim's method.

The changes pertaining to ganglion cells of the cortex and basilar nuclei are not remarkable. The cells around the cystic degeneration present very marked sclerotic changes (Nissl), combined with remarkable deposits of fatty, pigmented substance. Otherwise the parenchymatous involvement is not very conspicuous. The unusually small brain ought not to be considered as an atrophic condition due to the parenchymatous degeneration of the brain. The small brain with apparently simpler convolutions would indicate hypoplasia rather than atrophy of the brain.

The most striking alterations are those of the myelin-sheaths and the glia cells. In the areas of the softening, mentioned above, the myelin-sheaths show marked, but not complete degeneration (Fig. 3). The line of demarcation between normal and abnormal parts is not as sharp as in multiple or diffuse sclerosis as usually reported, but shows a gradual transition. Even in the center of the degenerated marrow, and in this respect differing from cases formerly reported, the myelin-sheaths have not entirely disappeared. The involved focus shows loosened myelin fibers and irregular degeneration. Some fibers are thin with light staining, while others are thick, showing irregular swelling and poor staining qualities. This kind of degeneration is found, not only in the softened areas of the right hemisphere, but in the whole extension of the right centrum semiovale, in the greater part of the left centrum semiovale, the internal capsule and the adjacent part of the left lenticular nucleus. In the

direct neighborhood of the cysts both myelin fibers and axis cylinders have entirely disappeared. The degeneration of the myelin-sheaths appears to have occurred hand in hand with that of the axis cylinders and in this respect it differs from the cases of Schilder and others.

By Weigert-Pal's staining the pyramidal tracts both in brain stem and spinal cord appear somewhat paler than other parts, suggesting possible secondary degeneration.

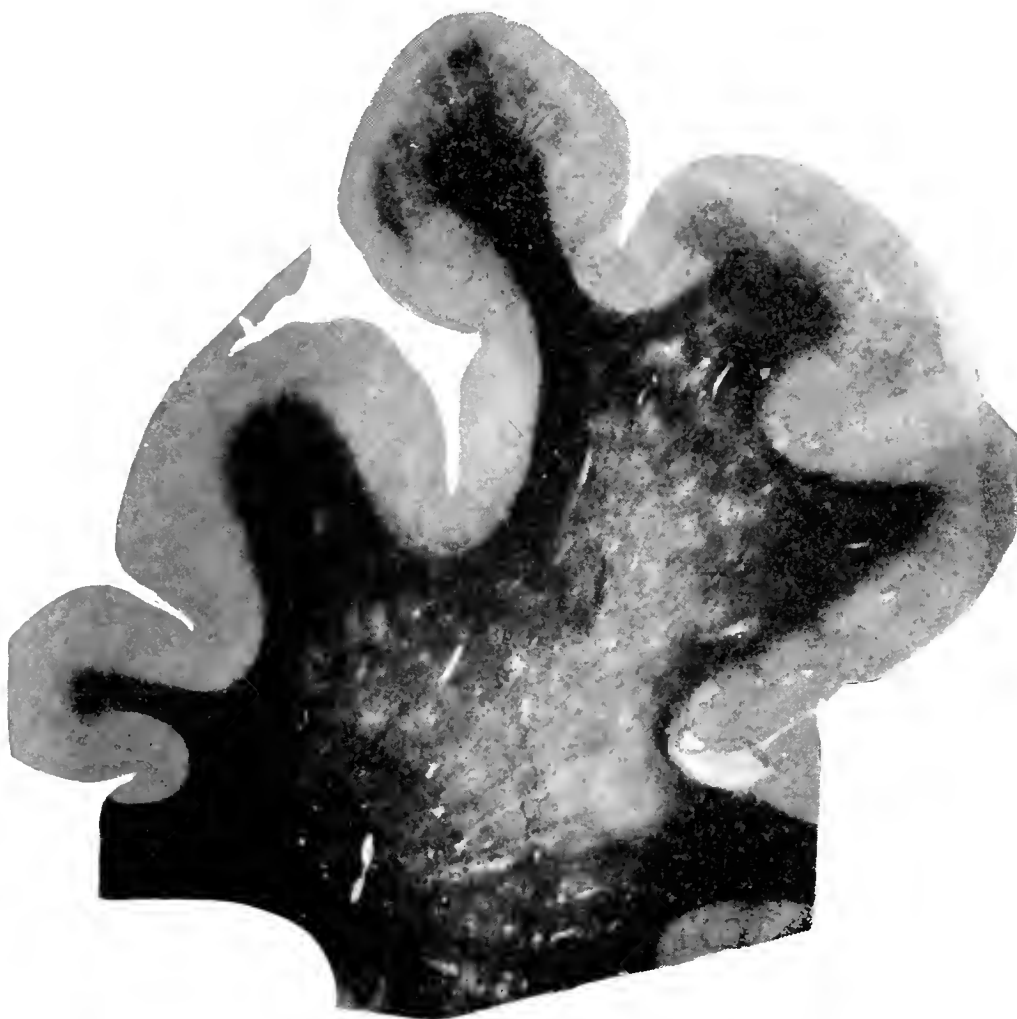


FIG. 3. Degeneration of myelin sheaths in the centrum semiovale of right side.

The most important pathological findings in this case, as the title of this paper indicates, consist in the changes found in the sustaining tissue. The glia cells are enormously increased both in the gray and in white matter of the whole central nervous system, *i.e.*, brain, brain stem, cerebellum and spinal cord. These cells are not only increased in number, but also show some striking peculiarities. The nuclei of these cells present unusual varieties of form and size. The superficial cortex layer is occupied by a great number of spider cells,

a smaller number of cells showing dark-stained, small, round nuclei and a few rod cells. In the 3-4 cell layer (Brodmann) of the cortex a remarkably large number of rod cells (Nissl and Alzheimer) of typical form are observed (Fig. 4). The nuclei of these cells are abnormally elongated (17-18 micra), having round ends and fine prolongations. In the deepest part of the cortex there is a larger number of the shorter and plumper form of rod cells, which correspond

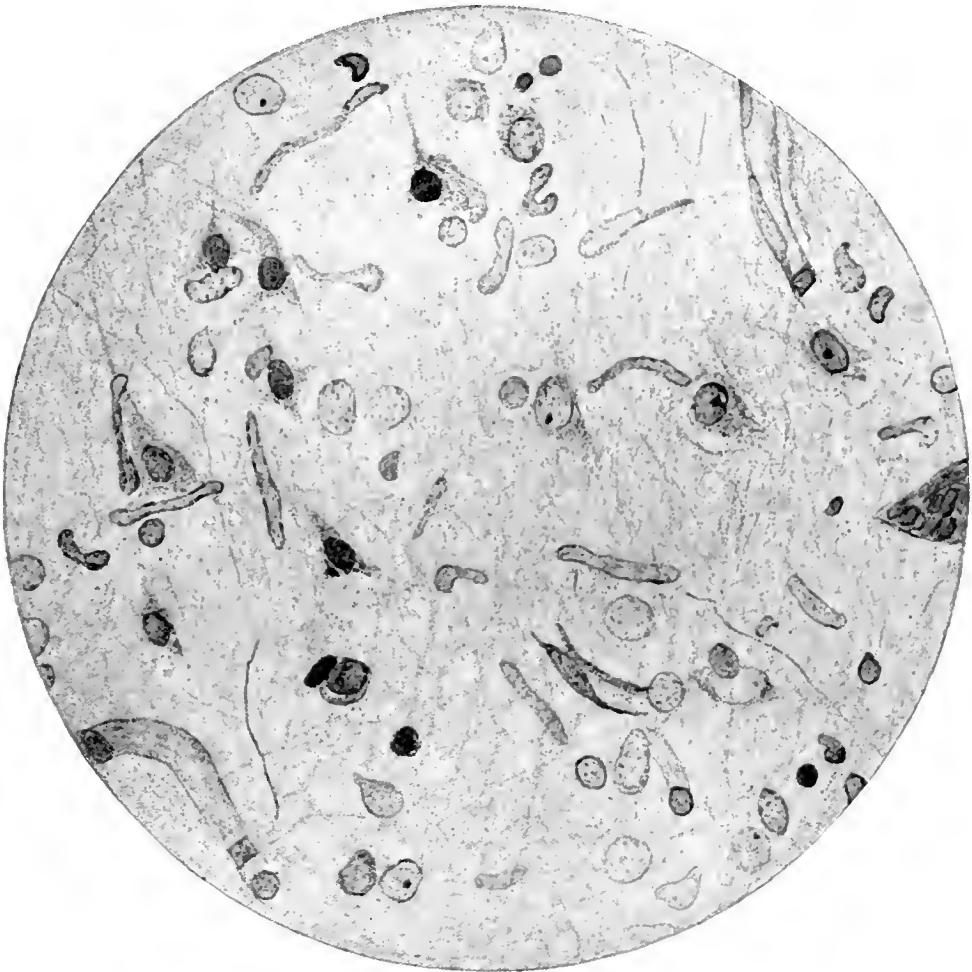


FIG. 4. Rod cells and various forms of the nuclei of glia cells in third layer of the posterior central convolution.

to the second group in Ulrich's classification. In addition to these rod cells, there are small, round nuclei of various forms. There are still other forms, including transitory forms between rod cells and glia cells.

The rod cells in this case do not show direct topographic relationship to the vessels, contrary to the claim of Nissl and Alzheimer that this is one of the very common findings for these cells. Nevertheless, many rod cells are found as trabant (satellite) of ganglion cells as described by Cerletti. Some of them seem to embrace the body of

the ganglion cells and are found, not only along the apical prolongation, but at the base of the cell body. The rod² cells have been observed by various authors in multiple sclerosis but not in diffuse sclerosis. According to Nissl the rod cells are not found in a sound brain, but are found principally in the paralytic brain and occasionally in other diseased conditions, but playing a less important part. Spielmeier found the rod cells in tubercular meningitis combined with general paralysis, while Dupré found them in arteriosclerotic



FIG. 5. The nuclei of glia cells in the white matter at the first frontal convolution not far from cystic degeneration.

processes associated with general paralysis. These authors are of the opinion that the rod cells indicate paralytic processes rather than other conditions. Sträussler found these cells in smaller numbers in a normal subject but abundant in congenital atrophy of the brain and gummatous meningitis. So far as the genesis of these peculiar cells is concerned the opinions of different authors vary. Some propose the ectodermal origin, others insist on the mesodermal. The second theory divides again into three different ones, namely: (1) derivation from the adventitia; (2) from the endothelium; and (3)

from the connective tissue of the pia mater. The first theory is affirmed by Cerletti and Sträussler and the second by Nissl and Alzheimer. Ris, Achúcarro and Ulrich believe both in mesodermal and ectodermal origins. In this present case the writer believes firmly in the gliogenous theory, because:

1. The rod cells are found together with abnormally increased glia cells.
2. There is every transitional form between rod cells and glia cells.

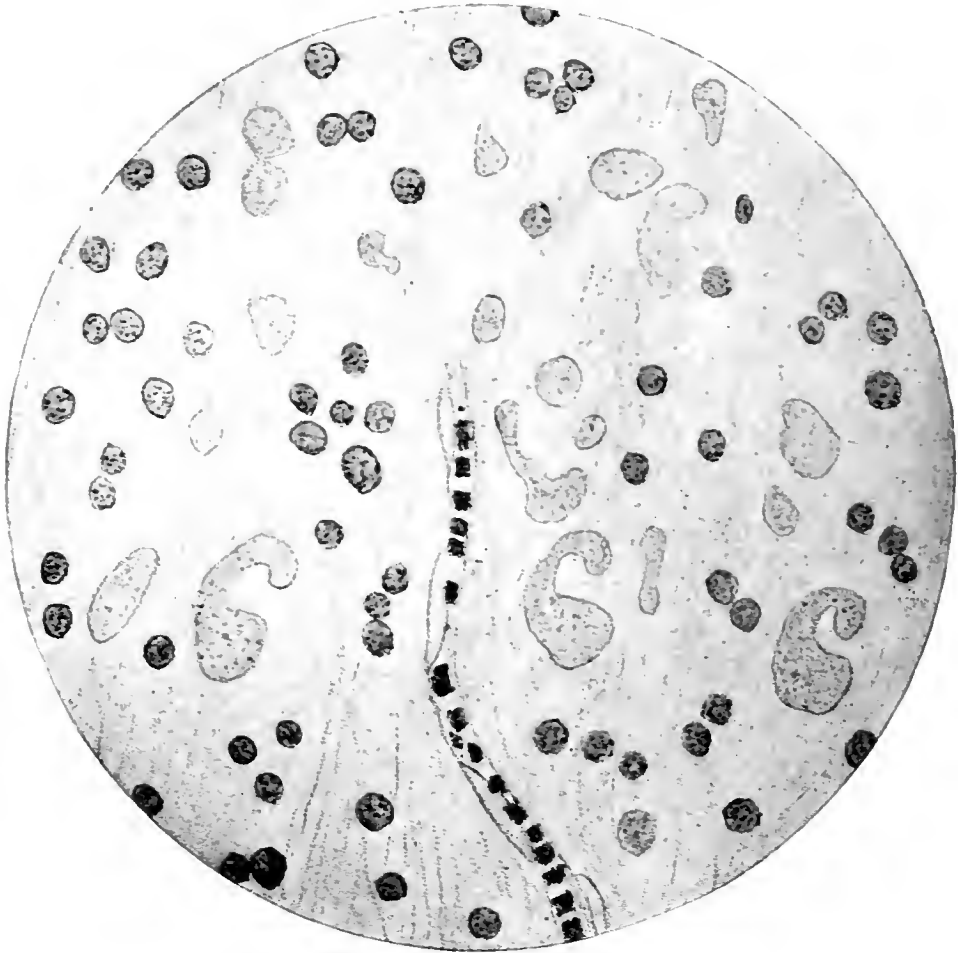


FIG. 6. Crook-neck squash formed nuclei of glia cells at pons.

3. There are many typical trabant rod cells as are illustrated in Fig. 4.

4. The direct relationship between vessels or pia mater and rod cells is not proved.

5. The rod cells are found in the cortex, where the alterations of the vessels are not remarkable.

In the white matter of the brain there are a greater number of pale, large nuclei of various forms, such as ovoid, elipsoid, pear-shaped, kidney-shaped, rod-shaped, etc. (Fig. 5). In the neighbor-

hood of the cystic areas the glia cells show more or less distinct regressive processes. The nuclei are dark stained, have no fine archi-

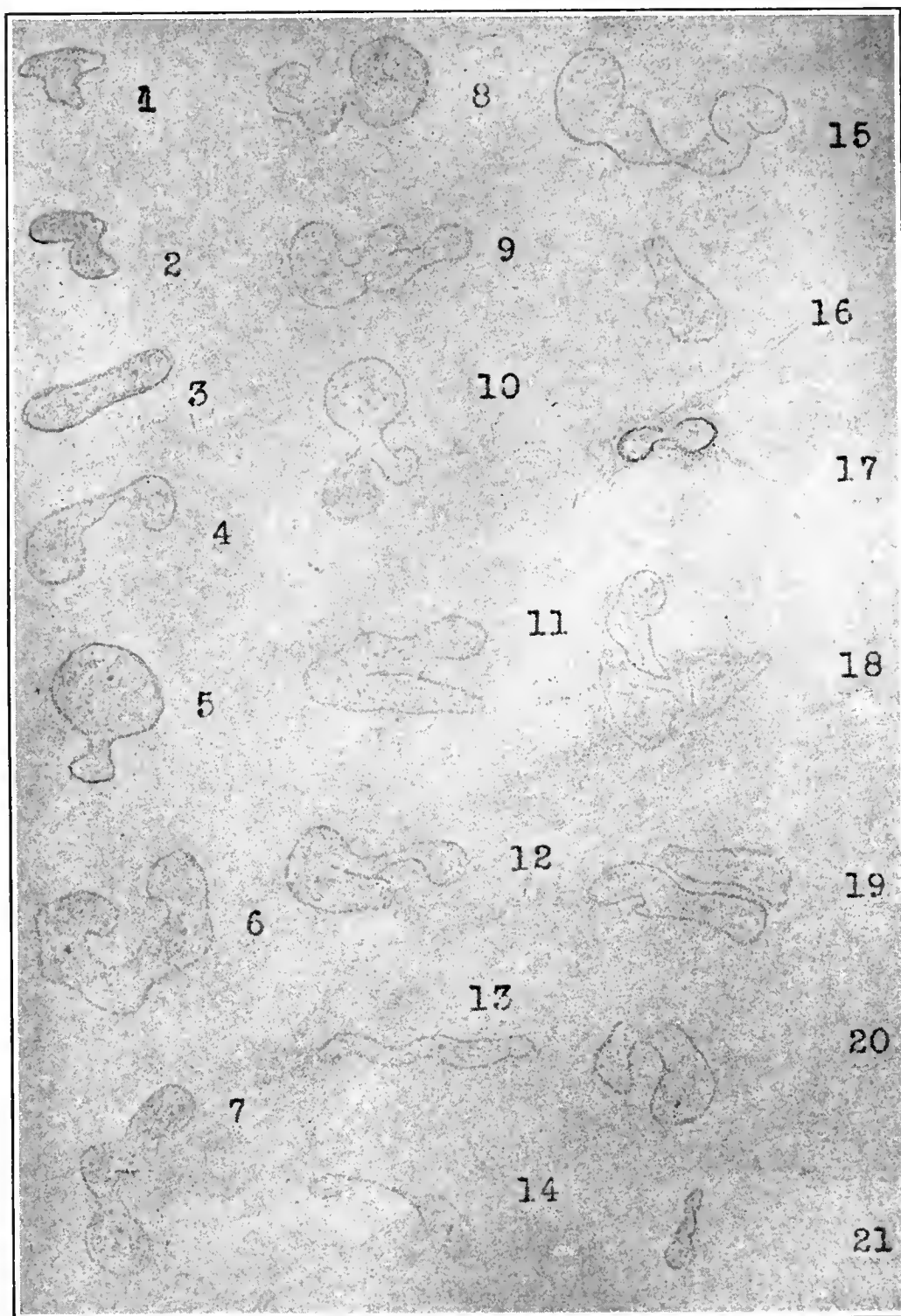


FIG. 7. Various forms of nuclei of glia cells found in peduncle and pons.

itecture and some of them appear to be contracted, while others show evidences of disintegration. There are only a few atypical rod cells in the white matter.

In the peduncle, pons and medulla the gliosis is most remarkable. There are almost all imaginable sizes and forms of the nuclei. In addition to the ones with round, oval, ovoid and spindle forms, there are many striking varieties of queer forms (Figs. 6 and 7). Club-shaped, biscuit-like forms, crook-neck squash forms and other



FIG. 8. Weigert's neuro-glia fiber staining, showing thickening of the border glia and fibers of the upper cortex layer.

peculiar shapes; bodies of nuclei with sprout, knob and prolongation, notching and lacing. Some of them are very well likened to the various forms of the motile ameba. The writer is of the opinion that these forms indicate the direct dividing of the nuclei, as was claimed by Lotmar in cases of glioma. Fig. 7 illustrates various

forms of the nuclei, in which 17 indicates a nucleus in the process of dividing, while 18 and 19 suggest the nuclei already divided.

In the cerebellum glia cells are found very much increased in the Purkinje cell layer and in the white matter. Forms and sizes of the nuclei are manifold as in other places, showing also fairly abundant specimens of the rod cells.

Throughout the spinal cord glia cells, though not so numerous as in the brain stem, are abnormally increased. Here, rod cells of atypical form are observed, together with nuclei of various forms and sizes.

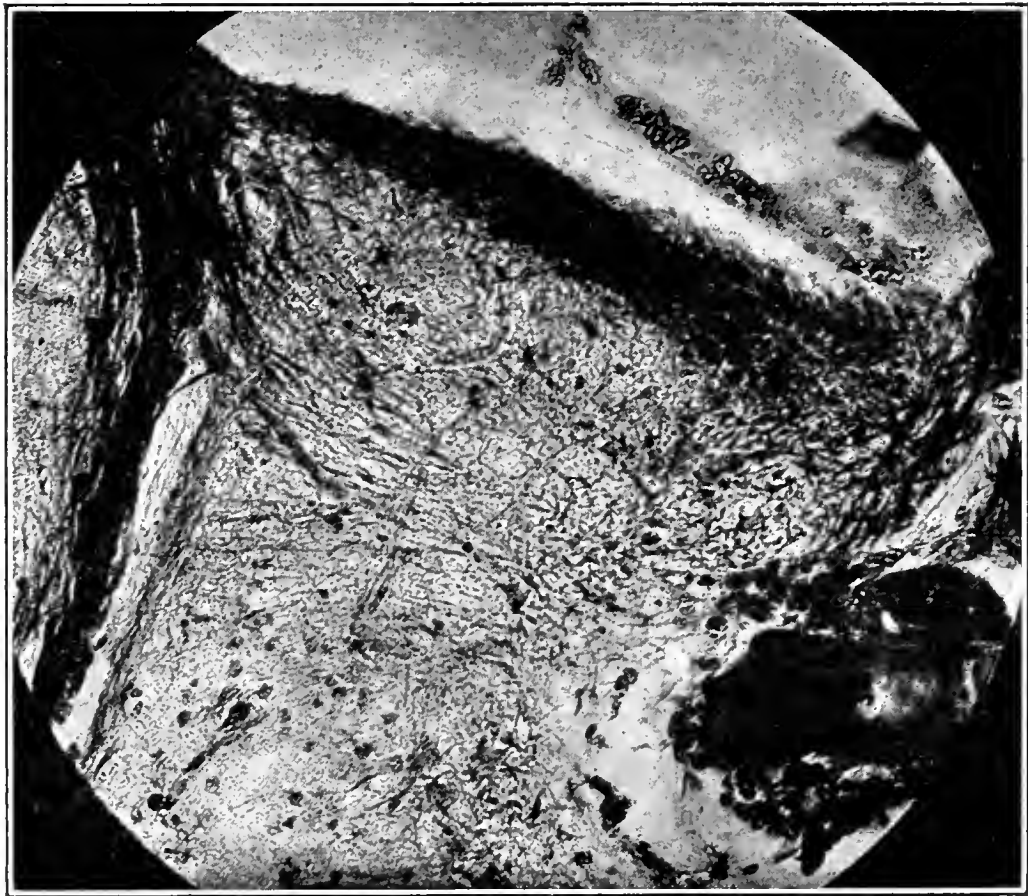


FIG. 9. Weigert's neuroglia fiber staining. Thickening of the glia-fiber of the cell free border. Envelope formation around the vessels.

The new formation of the glia fibers is remarkable at the cell free border of the cortex, especially at the central region of both hemispheres. This fiber network of the border is considerably widened, and at the same time, the increase of fibers going into the cortex layer is apparent; the fibers are well demonstrated deep into the 4-5 layer (Brodmann) (Fig. 8). The increase of glia fibers is not limited to the free surface of the cortex, but is also around the vessels,

making a thick envelope. This envelope formation is readily understood, if one is acquainted with the condition, which Nissl, in agreement with Weigert, has emphasized, that the vessels, being of mesodermal origin, behave toward the nervous tissue like a foreign body, and therefore are isolated by a layer of the glia. The envelope formation is extremely marked at the central region of the right hemisphere (Fig. 9). So marked a protecting wall is not seen in general paralysis or arterio-sclerosis, in which the perivascular growth of the neuroglia fibers is commonly observed. The extraordinary formation of the protecting wall should be considered as a result of the exaggerated function of the pathological neuroglia. In the region of the softening, the formation of the glia fibers is not remarkable, but at the internal capsule and the lenticular nucleus of the left side, the brain matter is entirely occupied by a dense network of rather fine fibers.

The vessels of the brain are more or less sclerotic. In the central region of the right hemisphere the walls of the vessels are considerably thickened, and in certain parts an abnormal growth of the adventitious tissue is seen forming tumor-like bodies. Some of the cells of the vessel wall seem to be isolated and are scattered in the brain matter. A similar process is observed by Bonome, Bielschowsky and Ranke in glioma. The perivascular lymph spaces, especially in the above-mentioned parts, are dilated and large numbers of cells carrying pigment, a smaller number of fat corpuscle cells and a few lymphocytic cells are observed. The alterations of the vessels are only marked in the circumscribed areas of the right hemisphere and not generally over the whole brain. Although there are softened areas and cells carrying pigment around the vessels, the whole process of the gliosis can not be considered as a secondary change due to the primary vascular alteration.

Besides the remarkable findings of the sustaining tissue, there are a number of interesting changes in the cerebellum. Here, the Purkinje cells are not remarkable in form and size. But a considerable number of Purkinje cells are found high up in the molecular layer and present a typical case of so-called Heterotopia (Fig. 10). In addition to this peculiar finding, there is swelling of the dendrites and the axis cylinders. The swelling of the latter has been observed by the writer in various kinds of brain diseases but the former is found only in selected cases and very rarely. Besides those of the amaurotic family idiocy, Sträussler described the same kind of swelling, with the enlargement of the axis cylinders in a case, which manifested certain cerebellar symptoms, agitation and intellectual weakness.

The author attributed this peculiar change of the dendrites to the acquired factor playing upon the congenital weakness. In our case the abnormal smallness of the brain and the heterotopy of the Purkinje cells all together point to the congenital disturbance of the development. The writer considers, therefore, that this peculiar swelling of the dendrites has resulted from the external factor

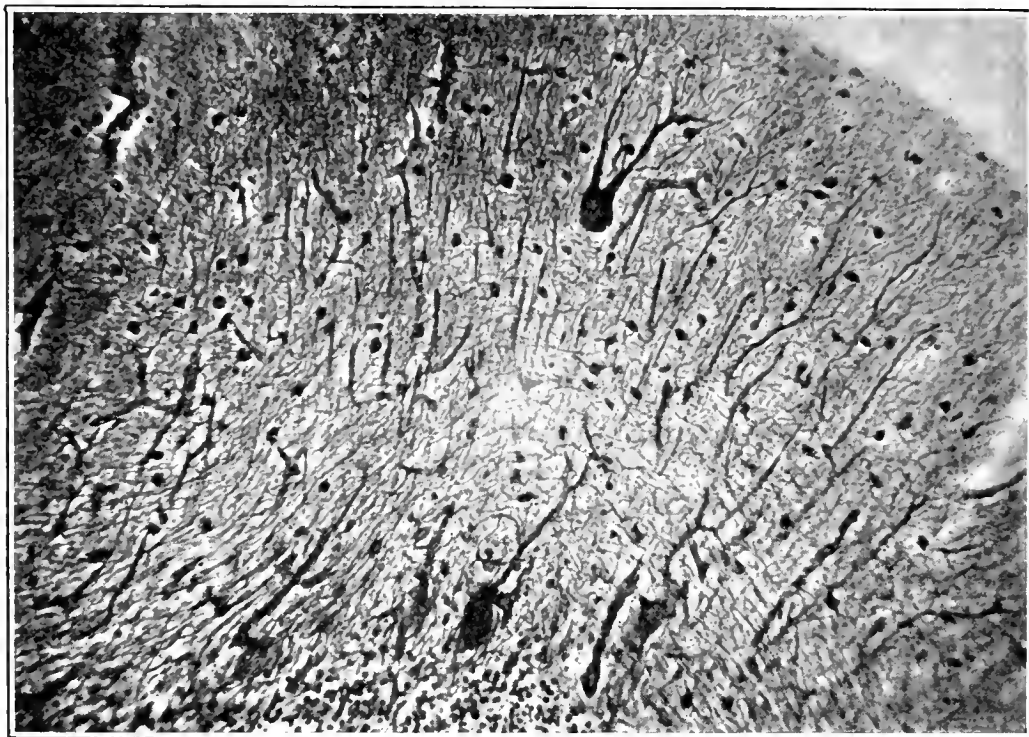


FIG. 10. Heterotopy of the Purkinje cell.

playing upon the inherited weakness. Upon this peculiar change, however, the writer intends to publish in a later communication his further observation and his opinion.

PATHOLOGICAL CONSIDERATION OF THIS CASE

The pathologic anatomical findings in this case are, as described above, very much complicated and make the correct interpretation of the case extremely difficult. Among the remarkable findings, the universally appearing gliosis of the whole central nervous system, could reasonably be considered as the principal pathological feature of this case. But can the term "diffuse sclerosis" be applied and are those manifold symptoms covered by this diagnosis?

Before going into further discussion let us briefly state what is diffuse sclerosis. Macroscopically this disease is characterized by an abnormally firm consistency of the medullary substance. Chronic

internal hydrocephalus and the thickening of the pia mater are also frequent findings. Although the macroscopical findings are very characteristic, the histological substrata are rather vague in appearance. Some of the cases are classed as pseudo-sclerosis because of the negative findings, in spite of the macroscopical characteristics. In the histological findings the abnormal growth of the interstitial tissue is described as an essential anatomical factor. This process is, however, usually restrained in the medullary substance. Hyperplasia of the glia in the cortex has been heretofore very rarely observed and always accompanied by degenerative process of the nervous parenchyma. In the medullary substance most authors observed complete disappearance of the myelin sheaths with more or less decided demarcation against the normal tissue and with relatively well preserved axis cylinders. Infiltration of the peri-vascular lymph space with fat corpuscle cells and lymphocytes is observed by nearly all authors. Cyst formation, or softening, is reported very rarely. The polymorphous condition of the nuclei of the glia cells was observed only by Schilder. There is no case reported, showing an unusual growth of the rod cells, either in the cortex or marrow. The cerebellum is very rarely involved in the pathological processes, showing increase of the glia mostly in the medullary substance. In the spinal cord the sclerosis is very marked. Besides the gliosis in the pyramidal tracts the degeneration of the latter is observed as one of the most frequent findings.

In our case the macroscopical finding of abnormally firm consistency of the medullary substance corresponds exactly with the case of diffuse sclerosis. The pia mater is thickened, though there is no internal hydrocephalus. Microscopical findings are not exactly typical. At least they differ in certain respects considerably from those reported by Heubner or Haberfeld and Spieler. However, as was mentioned before, there are no definite microscopical findings for this disease and our case is reasonably grouped with this kind.

In the first place we have to differentiate our case from the diffuse glioma, with regard to the cyst formation, which is rather characteristic for the glioma, and also with regard to the extreme polymorphous condition of the nuclei of the glia cells.

The cyst formation, though it is very characteristic for the glioma, is not an absolutely new finding for the diffuse sclerosis. Rossolimo observed a large cyst in a case of the typical multiple sclerosis. Schilder found also small cysts in a case of the diffuse sclerosis, which he called *encephalitis periaxialis diffusa*. As for the polymorphous condition of the nuclei of the glia, our case cer-

tainly presents an astonishing example. Even in glioma, findings like this, except in the case of Lotmar, have not been described. But Schilder observed almost exactly the same condition of the nuclei in his diffuse sclerosis case. There are still quite a few points which lead us to consider this case as diffuse glioma. In the latter the boundary of the growth is indistinct and there is no change of the external configuration. Our case is similar to diffuse glioma and differs from the reported case of the diffuse sclerosis, since it shows no distinct demarcation between the degeneration and the normal parts. In the reported cases the axis cylinders of the focus remained in a relatively healthy condition, while in our case, as well as in diffuse glioma, the degeneration of the myelin sheaths is always parallel with that of the axis cylinders. The findings in the vessels, especially the infiltration of the adventitious cells into the brain matter, are very peculiar and these are described by Bonome, Bielschowsky and Ranke in glioma. Admitting all these similarities, our case, in which the increase of the glia element is universal and distributed equally over the whole central nervous system, can in no way be considered as a diffuse glioma.

In the second place general paralysis should be considered on account of the slight pial and perivascular infiltration and remarkable thickening of the fiber network of the border. The appearance of the abundant rod cells indicates also general paralysis. Blood serum was positive for Wassermann test though the spinal fluid was negative for ordinary laboratory tests. But one of the most important findings for the general paralysis, *i.e.*, the degeneration of the ganglion cells is not observed. Eighteen years duration of the mental disease does not indicate general paralysis. Negative laboratory tests of the spinal fluid together with above-mentioned circumstances will safely rule out general paralysis.

What is the etiology of this disease? Is it an exogenous or an endogenous disease of the central nervous system? Is the hyperplasia of the interstitial tissues secondary to the degeneration of the nervous parenchyma or is it a primary overgrowth of the sustaining tissue which in consequence causes the degeneration of the nerve element? This is a very difficult problem to answer.

Strümpell calls this pathological process "chronic interstitial encephalitis" on account of the inflammatory character of this disease. Weiss is of the same opinion. Rebizzi differing with these authors claims it to be a primary disease of the nervous element with consequent growth of the neuro-glia. In general, modern pathologists seem to have a tendency to deny the primary growth of the sustain-

ing tissue which is generally called "chronic interstitial . . . itis." Among the still obscure etiologies of this disease there are lues (both congenital and acquired), brain trauma, acute infectious disease, hereditary neuropathic taint and some unknown toxic agents, etc. But most authors are of the opinion that this disease is, in fact, only a terminal stage of various different diseases.

Let us first analyze, briefly, the pathologic anatomical findings of our case and go over the etiology of our particular case. In our case, there are a number of hypoplastic conditions of the brain and the body organs. The brain is abnormally small with apparently simpler convolutions. The heterotopia of the Purkinje cells is an unusual condition, which indicates a disturbance of development as does the high position of the left tube and ovary. Furthermore the swelling of the dendrites suggests, as was explained before, the congenital weakness of the nerve element. All these facts point to the congenital factors underlying in this case. The glia cells in this case seem to have had congenital predisposition, to be attacked by an external agent. Schilder's case showed also hypoplastic condition, such as chlorotic aorta and absence of the ovary on one side, though there were no abnormalities in the brain. Haberfeld and Spieler observed two brothers who died of this disease, which, in both cases, showed the same symptoms and ran the same course. All these suggest together with our case the endogenous component underlying in this disease.

In our case the newly formed glia cells are not uniform in character. The glia cells of the cell free border are apt to build more fibers. In the cortex layer, contrary to this, there are a remarkable number of rod cells of gliogenous origin with a small number of glia cells having large and small nuclei. In the medullary substance of the cerebrum there are more large nuclei than small ones. In the brain stem the proliferative process is most marked. Here there are almost all imaginable forms of the nuclei, suggesting direct division of the cells. The polymorphous condition of the nuclei in the cerebellum and the spinal cord is not so marked as in other parts, though there are a variety of forms and a considerable increase of the cells. In brief the newly formed glia cells show topic diversity which is not at all associated with the degenerative process of the nerve parenchyma. This topic diversity, with the exception of the active proliferative process in the brain stem, seems to express the different functions of the neuroglia cells. But these functions are performed only in an exaggerated manner, the glia cells of the border, for example, producing luxurious fibers, and the cells of the cortex ex-

hibiting peculiar shapes of the rod cells, etc. There is no reason, therefore, in our case, to consider that the general gliosis is a secondary process due to a primary nerve degeneration. It is more probable to presume that the proliferative process is a primary one. Our case, in this sense, is neither a terminal stage of the disease of the nervous parenchyma nor a chronic interstitial inflammation. It is rather to be grouped with neoplasma such as diffuse glioma.

CLINICAL CONSIDERATION IN REVIEW OF THE PATHOLOGIC ANATOMICAL FINDINGS

The diffuse sclerosis which has been reported is a disease occurring in young individuals. With the exception of Strümpell's case (sixty-six years of age) all cases began in childhood or at least in the beginning of puberty. Schupfer's case is nine years of age; Rossolimo's case, sixteen; Ceni's case, nine; Beneke's, one and three-fourths; Haberfeld and Spieler's, seven; etc., etc. Both sexes seem to be attacked equally.

The clinical symptoms which have been reported, consist of spastic paralysis and progressive dementia. The disease is fatal, the duration being only several years. The cause of death is usually malnutrition and decubitus.

Our case is clinically as well as pathologically considerably different from those already reported. The onset of the disease is very late. The duration of the disease is eighteen years. She did not show typical spastic paralysis, though she showed oftentimes disturbance of the gait and evidences of hemiplegia. The most apparent symptom, especially in the former half of the course, was a manic depressive manifestation. The hemiplegia is explained by the softening of centrum semiovale and the internal capsule. But how is the manic depressive condition explained? The writer presumes an intermittent growth of the neuroglia, as in cases of glioma. And this intermittent growth seems to be expressed clinically in alternating symptoms which in the later half become very much more prominent, the cyst and the softening of the centrum semiovale, especially in its anterior part, will give the satisfactory explanation. The fainting spells with unconscious periods are explained easily by so marked a change in the cortex.

CONCLUSION

The writer presents a case of diffuse cerebro-spinal sclerosis, which both clinically and anatomically considerably differs from the cases already reported.

It showed in the beginning almost typical manic depressive manifestations, but later, the constantly progressing dementia was in the foreground. The patient showed evidences of hemiplegia, but the spastic paralysis was not as marked as in a case of Heubner form.

The principal pathological anatomical findings are: abnormally firm consistency of the medullary substance with softened and cystic areas, diffuse increase of neuroglia element in various forms, diffuse degeneration of the myelin sheaths and axis cylinders of the white matter, etc.

As for the etiology of this disease the writer assumes an endogenous factor, based on a number of hypoplastic conditions of the brain and the body organs.

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Society Proceedings

CHICAGO NEUROLOGICAL SOCIETY

ANNUAL MEETING, MAY 15, 1919

HUGH T. PATRICK, M.D., in the Chair

SWIFT-ELLIS INTRASPINOUS INJECTIONS FOR GENERAL PARESIS

DR. PETER BASSOE reported a number of cases in which the Swift-Ellis treatment had been used in general paresis, the cases showing, as he believed, that salvarsanized serum can produce striking changes for the better or the worse.

Eight at least of the twenty-six cases reported are living. Three of them are entirely well, three are physically crippled although mentally well, one has shown mental improvement, another has relapsed after improvement. One patient has had as many as thirty-three intraspinal injections. The treatment has been continued intermittently since 1914 and the patient able to work almost continuously. His first symptoms had been apoplectiform attacks with transient aphasia. Dr. Bassoe states later that since presenting this report the patient has developed delusions of grandeur and persecution and has been committed to the Chicago State Hospital.

In another patient 32 c.c. of salvarsanized serum was followed by stiffness of the neck and legs, loss of sphincter control and a cloudy spinal fluid containing mostly polymorphonuclear cells. This condition was temporary. With another patient spastic paraplegia resulted, which has persisted since for two years but is slowly improving. Mentally he has been in good condition during this time, beginning with a period shortly after the injection and the laboratory tests, which were strongly positive at first, have been negative.

Another patient with taboparesis developed gradually a paraplegia, while the mental symptoms cleared up, while still another case showed the same complementary result with disappearance of laboratory symptoms, though there was a slight temporary recurrence of mental disturbance following upon an accident. It is probable that in these cases the early administration of treatment was the cause of the more positive result.

DR. RALPH C. HAMILL stated that in his experience a negative Wassermann was obtained by injections of mercuric chlorid, 1/150 to 1/100 grain dissolved in special fluid when other methods had failed. This method of injection allows the albuminate of mercury to form in the syringe and then to be resolved by the further amount of albumin in the spinal fluid. He suggested that in the meningeal reaction referred to the pleocytes might not exert a curative action in that they were phagocytes attacking foci out of the reach of the medication.

DR. GEORGE W. HALL questioned whether according to Dr. Bassoe's description of his cases all of them could have been general paresis. He believed that the absence of positive Lange curve made this case doubtful and perhaps indicated a diffuse syphilitic endarteritis rather than a general paresis. He used mercuric chlorid and succinimid of mercury, dissolving it in the spinal fluid and was also using patient's blood serum, injecting it into the spinal cord and following by intravenous medication experimentally as he thought this would be a much less dangerous method. He thought mercuric chlorid safe up to 1/50 grain but no higher.

MAJOR LEWIS J. POLLOCK called attention to the clinical difference between the variability to the permeating power of drugs and the conclusions regarding this based upon experimentation. The permeating power of drugs depends not on one but on several factors; passage through the blood vessel, through the cell membrane and the ability of the cell membrane to take up the drug. After a presentation of varying views as to the advisability or not of treating general paresis intraspinaly Dr. Bassoe summed up by saying that he believed it was justifiable in a disease with such bad prognosis to give treatment where there was likelihood of some damage. Many of his patients improved at least temporarily under intraspinal treatment when extensive intravenous treatment had not helped them.

SPECIAL MEETING, MAY 27, 1919, HELD AT U. S. ARMY GENERAL
HOSPITAL 28, ON INVITATION OF THE COMMANDING OFFICER,
COL. WILLIAM N. BISPHAM

NERVE REGENERATION AND NERVE SUTURE

LIEUT.-COL. DEAN D. LEWIS operated on two patients before those present and commented upon methods of treatment of nerve injuries and the regeneration of the nerve. The first operation was utilized to point out the advantage of simply freeing the nerve from the cicatricial tissue, which in this case imbedded it, over excision of a portion of the nerve and suturing it. The injury was due to a high explosive wound which had extended from the greater trochanter to the gluteal field

and which had resulted in paralysis and muscle atrophy below the knee and some trophic disturbance. A hard fusiform nodule or enlargement revealed the injury to the nerve. Besides it was found imbedded in scar tissue. This was loosened from it and the hardened sheath at the point of enlargement was cut away. Considerable tough tissue was removed, after which the injured nerve was reduced nearly to normal size and consistency. The surrounding muscle was used as the bed of the nerve, the operator believing, with avoidance of hemorrhage, that healthy muscle is the best support the nerve can have.

The second operation performed was that of extensive shell wound at the upper third of the forearm. The ulnar nerve which had been injured had recovered, but the distribution of the median nerve still showed the original motor and sensory disturbance. The operator searched for the proximal and distal stumps of the nerve. There was a distance of two inches between these, so a transplant was taken from the cutaneous branch of the radial, which was sutured to the two carefully trimmed stumps and enveloped in muscle and the wound closed. Colonel Lewis shared the opinion of others that the operation upon nerves of the forearm is questionable, especially on the lower part of the arm, because of the long and severe pain which is likely to succeed operation.

Two patients were also presented with distinct return of motor power with use of the muscle bed, after neurolysis, in whom there had been physiologic interruption of the nerve six months or more. Cases were reported also of primary suture which had been followed by return of motor power and function. Colonel Lewis believes that neurolysis is of distinct advantage over suture except in cases of anatomic block. When the nerve has actually been divided, end-to-end suture must take place. The aim should be an accurate end-to-end approximation of corresponding funiculi providing for nonaxial rotation of the nerve.

Autotransplantation, nerve grafting with autocable graft or calve's fetal sciatic nerve, or tubulization may be resorted to when other methods cannot be resorted to. Or defect in the ulnar may be remedied by dissection of the ulnar nerve out of the groove behind the epicondyle and displacement of it anteriorly.

Colonel Lewis described the regeneration of a nerve as the formation first of delicate protoplasmic bands probably originating from the nuclei of the neurilemma, the more active and numerous ones being from the proximal stump. Each axis cylinder sends out great numbers of neurofibrils toward the distal stump and the protoplasmic bands act as conduits for them. The so-called neuroma which forms on the proximal stump is made up largely of spirals of these neurofibrils which turn and wind about the axis cylinders and of pads which form at the ends of these. He believes that injection with alcohol prevents this formation.

CRANIOPLASTY

MAJOR DALLAS B. PHEMISTER described an operation by which he had repaired a serious cranial defect in a patient hit upon the head by a bit of high explosive shell. A fragment of helmet had been carried three quarters of an inch into the brain in the left parietal region. There had been no unconsciousness with the injury and no aphasia. The right arm and leg had been paralyzed, the leg remaining so, while the arm had recovered to a considerable degree. In the five months preceding operation the patient had had six Jacksonian fits.

A narrow shelf or ledge was prepared all about the cranial opening on which a transplant was fixed. The transplant was taken from the outer table of the parietal region, the pericranium being carefully preserved. Such transplants are found to attach themselves readily to the surrounding bone and to maintain their vitality. Thus they serve not only as adequate protection but in maintaining the patient's normal appearance.

THE PHILADELPHIA NEUROLOGICAL SOCIETY

REGULAR MEETING, NOVEMBER 21, 1919

The President, DR. J. HENDRIE LLOYD, in the Chair

AN UNUSUAL SYMPTOM GROUP FOLLOWING INFLUENZA

DR. BENJAMIN WEISS presented a patient who showed a staggering gait with some ataxia and incoördination, developing several months after an attack of influenza. There was slight impairment of vision and the eye examinations revealed secondary optic atrophy in the right eye and choked disk in the left.

FRIEDRICH'S ATAXIA IN TWO COLORED BOYS—BROTHERS

DR. J. HENDRIE LLOYD reported these two cases in a negro family of healthy parents. The disturbances began in one patient at the age of eight, in the other at the age of six. There was ataxia and slight sensory changes. There were some disturbances of reflexes. There was slight optic atrophy. Speech defect and nystagmus were only slightly present. These do sometimes appear only late in Friedrich's disease.

FRIEDRICH'S ATAXIA IN MIDDLE AGED MEN—TWINS

DR. GEORGE WILSON presented two cases which were unusual in type but blended in a way that had been before observed in members of the same family in nervous diseases. The atypical symptoms presented are

not unknown to Friedrich's disease while others that were absent are not always observed in the disease. Other symptoms were the more usual ones.

TWO SISTERS WITH FRIEDRICH'S ATAXIA

DR. J. W. McCONNELL presented two cases of sisters of 22 years and 19 years with loss of reflexes in upper and lower limbs in the case of the elder sister and of the lower limbs in the younger. There was similar foot deformity in both.

HEMIPARESIS WITH PARALYSIS OF THE SYMPATHETIC

DR. WILLIAM G. SPILLER reported a boy who had had a hemiparesis from early childhood. The sympathetic eye innervation was paralyzed on the side of the hemiparesis.

A CASE OF CEREBELLAR ABSCESS

DR. ALFRED GORDON presented the case of a boy of 14 in whom there were many symptoms pointing to cerebellar abscess deeply located. Temporosphenoidal abscess and labyrinthitis were also considered as possibilities. The diagnosis was made on the ground of the special character of the hemiasynergy, past pointing in the finger-nose test, and dysmetria. At the urgency of the aurist a mastoidectomy was performed and the patient was trephined in the temporal region of the right side, but no pus was found in either case. The patient died the next day and necropsy revealed a large abscess in the right cerebellar hemisphere with pus.

ASYNCHRONICITY OF THE DIADOKOCINESIS FROM A MESENCEPHALIC LESION IN THE COURSE OF ENCEPHALITIS LETHARGICA

DR. TOM A. WILLIAMS reported the case of a woman in whom involvement of the cerebellar system was plainly shown by simple testing which revealed interference with the efferent cerebellar impulses. These manifestations occurred amid a variety of symptoms revealing the whole condition present. The pronator supinator diadokocinesia on the right side was normally rapid while that on the left side was much reduced in rapidity.

METHOD OF REMOVING PHOBIA. AGAROPHOBIA COM- BINED WITH CLAUSTROPHOBIA

DR. WILLIAMS also reported the cure of a colored woman who had suffered eight years with inability to cross a wide street or remain in a church or theater without symptoms of intense emotional disturbance.

The phobia was traced to a single incident when the first symptoms had appeared. The patient was enabled, "compelled" to understand the mechanism of hysterical misinterpretation and the resulting emotions and to realize her own psychologic responsibility toward the situation. She was then compelled to demonstrate her ability to do that which she feared. The cure claimed resulted in less than a week.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MONTHLY MEETING, MARCH 18, 1920

GEORGE A. WATERMAN, President pro tem.

DISSOLUTION OF THE CONTINUITY OF THE SPINAL CORD BY A PROJECTILE PASSING NEAR BUT NOT DAMAGING THE VERTEBRAL COLUMN

DR. H. C. SOLOMON presented the case of a soldier twenty-two years of age, wounded in battle November 3, 1918. The bullet wound was at the level of the eleventh dorsal vertebra, about a centimeter to the left of the median line. The next day X-ray examination showed a foreign body in the right chest, said to move with respiration. He arrived at a base hospital a week later, at which time he had the symptoms of a complete transverse myelitis: paraplegia, incontinence, etc. At this time, one week after the injury, he already showed several areas of decubitus; over the sacrum and both great toes. He lived until January 10, a little over two months after his injury. During this time there was no change in the paraplegic symptoms, but the decubiti increased.

Autopsy on January 11, 1917, showed the body of a markedly emaciated white male, presenting a tremendous bedsore about 7×9 inches extending from the left iliac spine to the right, and from the level of the third lumbar vertebra to the anus, with the iliac spines visible and protruding. A small superficial decubitus was present at the tuberosity of the ischium and decubiti in both popliteal spaces exposed the tibiae and communicated with the joints. There were also pressure sores over the great toes and right heel. Edema was present to the level of the waist. There was a small healed scar at the level of the eleventh rib behind, one half inch to the left of the spinal column, undoubtedly the point of entrance of the bullet. The bullet tract can be traced through the muscles in the lower dorsal region of the back. Neither the vertebræ or their processes were fractured, and, as far as could be determined, there was no injury to the bones of the spinal column. The FB, however, traveled in close proximity to the vertebral

column, apparently passing between the transverse processes of the vertebrae. In the middle lobe of the right lung near its hilus, a piece of shrapnel approximately $\frac{1}{4} \times \frac{1}{8} \times \frac{1}{8}$ inch in size was found. The FB was walled off with no evidence of suppuration about it.

On removing the dorsal portion of the vertebral column, the dural sheath was exposed and appeared entirely normal. On opening the dura, however, the cord in the dorsal region opposite the bullet tract was found to be confluent, consisting of a grayish liquefied mass. This condition was sharply localized, having a length of $1\frac{1}{4}$ inches. There was a small portion of the cord posteriorly and laterally that was not entirely liquified. The pia above and below the injured portion of the cord was discolored a brownish black for an inch or so, apparently old hemorrhage. The cord above and below this area had its normal shape and consistency. The brain and its envelopes and venous sinuses were grossly normal.

The other positive autopsy findings were: slight pericardial pleural adhesions, discrete broncho-pneumonia of left lower lobe; slight dilatation of the ureters; cellulitis of the scrotum; acute cloudy swelling of the heart muscle, liver and kidneys; and septic degeneration of the spleen.

The cause of the destruction of the spinal cord is not easily seen. Possibly the velocity of the bullet traveling in a closed space may have produced the damage by commotion. A somewhat similar case was reported by Froment (personal communication). In his case the paraplegia had been produced by a bullet passing in close proximity to the spinal column. The paraplegia improved after four or five months. The X-ray findings showed no evidence of fracture.

To briefly summarize the case: There was a complete paraplegia following a gunshot wound in the back at the level of the eleventh dorsal vertebra, terminating in death after a little more than two months, death resulting from sepsis, incident to the paraplegia. The FB entering about one half inch to the left of the eleventh dorsal vertebra, traveled to the right, passing between the transverse processes of the vertebral column without apparently injuring the bone, and lodged near the hilus of the right lung. The spinal cord in the dorsal region and at the level of the shell path was destroyed and liquefied without any gross evidence of injury to the dura.

Discussion.—DR. HENRY VIETS: In Frazier's book on "Surgery of the Spinal Cord" there is a very beautiful illustration of a French case in which the bullet went near the vertebræ, cracked one of the laminae of the vertebra and caused a complete paraplegia. On autopsy there was no damage to the inside of the dura but the cord was completely cut across as sharply as with a knife. This is the only reported case that I have seen.

DR. W. J. MIXTER: I had a rather similar case. A boy was shot

with a 22-caliber rifle. He had a complete paraplegia. The dura was just nicked by the bullet which did not touch the cord. The cord showed fusiform swelling and its central portion was simply squeezed out. There was practically complete destruction of the cord except for a mere shell.

THE COURSE OF RECOVERY IN SPINAL CORD INJURIES

DR. STANLEY COBB showed a chart on which were plotted the recovery curves of twenty cases of spinal-cord injury. These cases were taken as they were admitted to Colonel Frazier's surgical service at U. S. A. General Hospital No. 11 at Cape May, New Jersey. They were observed and studied over varying periods of time from three months to nine months. The chart was made by dividing the abscissa into periods of thirty days and plotting against this ordinates in terms of the patient's ability or disability; in other words, the heading of the lowest ordinate is "*complete quadriplegia*"; above this is "*paraplegia*" and then in order the headings "*stands with support*," "*steps with support*," "*walks across the room*," "*walks a mile with support*," and "*walks a mile*"; above this, "*well*." In this way the general symptomatology is plotted against the number of days since injury and a curve of recovery shown.

The chart showed three main groups of cases—those in which the injury was very slight and was only discovered on routine examination. There were three such cases, all of which showed no disability due to spinal injury at the time of their discharge. The second group is composed of twelve cases and is the most interesting part of the chart. These men showed complete disability after their injury for a period of from fourteen to forty days. They then showed some definite return of function and thereafter rapidly improved for a period of from three to five months. At the end of this second period their recovery curves flattened out and the condition remained practically stationary. The chart, therefore, indicates that in the initial stage of complete paralysis no prognosis can be made, but if no return of function is shown at the end of forty days the prognosis is probably bad. If function begins to return at this time it will proceed for three or four months, after which time there will probably be no more improvement. The third group is composed of five cases which showed no improvement at all from the time of their injury up to the end of the ninth month.

It was attempted to study the bladder, rectal and sexual symptoms in a similar manner, but they were found to be too irregular to chart. It appeared, however, that cervical injuries showed symptoms of this sort only when they were very severe. The injuries in the lumbar and sacral regions almost invariably showed these symptoms but in an

irregular way; for example, sexual power could be entirely lost and urinary control hardly injured at all, or vice versa.

Discussion.—DR. MORTON PRINCE: I should like to refer to the discussion that we had here some months ago on the claimed great value of operation in cases of spinal cord injury. I then expressed skepticism regarding the claimed results of operation. I wish now to point out the bearing of Dr. Cobb's chart on that discussion. If an operation had been performed in these cases of Dr. Cobb's what pæans would have been sung here in praise of operation. I think we can't keep in mind too strongly the tendency to improvement without surgical interference in a certain number of apparently hopeless cases, as is shown by the history of the cases collected by Dr. Cobb and reported in his paper tonight.

DR. W. J. MIXTER: In regard to a question by Dr. Cobb as to whether surgery should come early or late it seems to me that that question must be passed along by the surgeon to the neuropathologist to get his opinion as to whether the injury is operable if done early or whether compression of the cord can be relieved successfully at a late date. Personally my late cases have been very discouraging. The early cases have not been very successful either.

THREE TYPES OF SPINAL CORD INJURIES IN WARFARE

DR. HENRY VIETS gave illustrative cases of a neurological, a urological, and a combined group. In the neurological group interest centers mainly on the localization of the injury, its extent and the physiology of the injured segments of the spinal cord. Studies in this class, especially those on the distal segments of a totally transected cord, have taught us much of interest regarding the normal function of the spinal axis.

The urological group comprises those cases that have marked urinary tract infection. All other aspects of the injury are decidedly secondary to this until such infection is cleared up.

The combined neurological and urological type is usually fatal if both factors are severe. On the other hand, a severe cord injury with a mild pyelitis is consistent with life for many years, provided the urinary infection is held in abeyance. When the urological aspect is severe, however, even if the neurological factor is mild, the prognosis is much more grave.

Discussion.—DR. W. J. MIXTER: I wish to add a word to what Dr. Viets has said about the difficulties of handling such cases in war work, particularly in handling them in a casualty clearing station. In a casualty clearing station under normal conditions with a certain specified number of wounded passing through such cases can be handled fairly well. When the press of work comes all the fine neurological work may break down entirely. An examination may be made in a

given case in order that a decision can be reached at once but it is impossible to pass along the information thus gained to the next man. For that reason it is very practical to hold these cases as nontransportables. Such hospitals for nontransportables should not be placed too close to the lines on account of shelling and since if there is an advance everything may be lost.

Coming naturally into this discussion is a case at present at the Massachusetts General Hospital of a woman who was shot in the back of the neck and the abdomen. The abdominal wound was cleaned up first, as was natural. The wound in the back of the neck was explored far enough to see that the second cervical vertebra was cracked, but the bullet was not found. It lies in the vicinity of the second vertebra, probably just inside the canal. She has at the present time a paralysis of the left leg, which is very slight, sensory paralysis of the right leg and almost perfect sensation of the right arm. She is in very good physical condition. Her temperature and pulse are both 100. The question comes up as to what we are to do next. Are we going to try to extract the bullet or should we let it alone. The X-ray shows the bullet just over or just within the laminae of the second cervical vertebra.

DR. HENRY VIETS: I have seen this case of Dr. Mixter's once or twice. I think the important point is whether or not the bullet carried with it infection to the point where it now lies. If there is infection, as happened in most of the war cases, I think laminectomy is certainly advisable. If it is not infected it is a great question as to whether to operate or not.

DR. STANLEY COBB: In connection with the question of the noncatheterization of these patients, I think experimental evidence is of interest. I did a mid-thoracic cord transection on a dog. I left the dog alone, hoping that in three or four days I would have an automatic bladder. I waited in vain. On the fifth day he died and autopsy showed an enormously distended bladder which filled almost the entire abdominal cavity. The bladder was so stretched that there were small hemorrhages all through it. I suppose the abnormal distention of the bladder may have paralyzed the sympathetic nerve. Other investigators who work on the spinal cord have told me that their animals die, as mine did, unless they are catheterized.

DR. HENRY VIETS (in closing): Apparently the automatic bladder is of great use to the patient as months go by, but the point is that the infection is much more important than the automatic bladder. As I have tried to point out, urology should stand first and neurology second. I believe that noncatheterization is bad neurology but if it will save the infection it is certainly worth while.

BOSTON SOCIETY OF PSYCHIATRY AND NEUROLOGY

REGULAR MEETING, APRIL 15, 1920

EVERETT FLOOD, M.D., President

X-RAYS OF INFLATED VENTRICLES DISCLOSING A BRAIN TUMOR

DR. WILLIAM JASON MIXTER: The first case I am going to present is one in which I consider I made a very definite mistake and with a fatal result. It was an unlocalized brain tumor in a child, presumably cerebellar, with internal hydrocephalus, contractures, and so on, an almost decerebrate animal by symptoms. X-rays did not reveal anything very definite in the way of a tumor although a shadow could be seen in the center of the cranium. X-rays taken after the cerebro-spinal fluid in the ventricles had been replaced by air under atmospheric pressure showed a very different picture for a large tumor mass presented itself very distinctly. This injection of the ventricles has been done by Dandy a considerable number of times, I think without as yet a fatal result. Unfortunately my first case was a fatality, the child dying within twenty-four hours. My feeling is that the mistake was made in letting in too much air. I think death probably was due in part at least to a change in pressure of the cerebro-spinal fluid. At autopsy the brain showed a very large tumor of the pineal gland.

Some four years ago I operated on a case of cerebro-spinal meningitis and tapped the ventricles replacing the infected fluid with serum. The patient received this treatment six times and made a practically uneventful convalescence. Previous to the intraventricular treatment he had had numerous spinal treatments and the cerebro-spinal fluid by lumbar puncture was negative. The case showed a very mild grade of choked disk and definite though mild symptoms of increased cranial tension. The case was reported by Dr. Hoch in the *Boston Medical and Surgical Journal*.

When in France I was very much interested in a case of cerebro-spinal meningitis in a nurse who finally died of a chronic type of this disease three months after her original infection, never having shown any evidence of increased tension or definite evidence of infection involving the upper meninges. At autopsy her ventricles were filled with a very turbid fluid showing meningococci in large numbers. If I remember rightly there was practically no infection in the tissues of the lower spine. She did, however, have an abscess in the spinal cord. She was not given this ventricular treatment.

A short time ago Dr. Ayer asked me to see a case of cerebro-spinal meningitis which he had been treating for some days, first with lumbar puncture, later with cisterna puncture which had responded at first very

well to treatment and after a time had not responded although the cerebro-spinal fluid by lumbar puncture was negative. Exploration of the ventricles showed turbid fluid. The patient was treated twice by injecting in the ventricles about 40 c.c. of serum and she is now ready to leave the hospital.

These cases to my mind are rather significant. In cases of cerebro-spinal meningitis which are not reacting to treatment but are still having temperature and above all an increased white count notwithstanding the absence of organisms in the cerebro-spinal fluid, I think that ventricle puncture, even if only for diagnostic purposes, is indicated. It is not, as a rule, a difficult operation.

Discussion.—DR. JAMES B. AYER: It was my privilege last year to do a great deal of work on experimental meningitis. In the animals on which we experimented we found that within twenty-four hours after meningitis had commenced the greater number showed also ventricular infection. It is not known whether or not this early and frequent infection of the ventricles is true of man, but owing to the greater course of the velum interpositum and velum medullare in man, by which it is presumed infection reaches the ventricles, it is probably less frequent and less early than in the experimental cat or rabbit. However, there is reason to think that the organisms usually reach the human ventricle provided the meningitis lasts long enough. In this case, the meningitis had lasted for three weeks in spite of vigorous treatment with a known effective serum. If as in the animal it is possible for ventricular infection to occur in twenty-four hours, or if we grant several days, it is unreasonable to treat patients indefinitely by lumbar puncture, or even by the more direct cistern puncture. The ventricles must be reached directly. What shall be our guide as to when ventricular exploration shall be made? If after a reasonable amount of treatment by the sub-arachnoid route with a serum of known efficacy in the case at hand, either (1) the organisms persist in the spinal fluid or (2) the organisms disappear, but symptoms of acute meningitis persist, then it is probably wise to investigate the ventricles.

THE ANATOMICAL IMPLICATIONS OF THE INTROSPECTIVE PSYCHOLOGY

DR. HAROLD I. GOSLINE: Introspective psychology is not an "arm-chair" psychology but was developed and is being added to by laboratory methods. It had its inception in the first psychological laboratory established by Wundt in 1876. Corresponding to this beginning and to its aims, this form of psychology is built up like any other science. It makes certain fundamental assumptions, it postulates and builds around these, assuming them to be true till some experience is arrived at which is not in accord with the postulates. Till then the postulates must stand as the truth.

On the basis of this psychology an analysis of personality is presented which reduces the complex mental functions, inner states, activities, ideas and perceptions, into simple mental processes, sensations, associations, reactions, and inhibitions.

If this data of introspective psychology is the truth, the author supposes that it can be made the basis for some conceptions of nervous system anatomy which are then presented. The presentation was mainly by charts which will be published in the original paper, of which this presentation was merely an abstract.

THE STATE INFIRMARY

DR. J. H. NICHOLS read a paper on the State Infirmary at Tewksbury, Mass., giving the history and development of that institution from the time of its inception, with a description of the present scope of its activities.

Current Literature

I. VEGETATIVE NEUROLOGY

1. VEGETATIVE NERVOUS SYSTEM.

Lortat-Jacob, L., et Hallez, G. L. PARALYTIC SYNDROME OF THE RIGHT SYMPATHETIC ACCOMPANYING AN ANEURYSM OF THE LARGE VESSELS AT THE BASE OF THE NECK. [Bull. et mém. Soc. méd. d. hôp. de Par., 3^e ser., 43, 1919, 137-42.]

A woman, 28 years of age, showed Bernard-Horner's syndrome on the right side as evidenced by narrowing of the palpebral fissure, enophthalmos, myosis and by the absence of sweating on the right cheek and upper limb. The arterial lesion appeared to be at the junction of the common carotid and subclavian.

Vignolo-Lutati, C. RAYNAUD'S DISEASE AND SYPHILIS. [Morgagni, 61, 1919, 147.]

A man aged 50, had syphilis at 30. Eight years later he began to suffer from feelings of formication and cold in the hands and feet, with pain especially marked at night. Two years later attacks of pain occurred in the toes of the right foot, ending in gangrene. Subsequently, attacks of pain with the formation of purpuric and gangrenous patches affected the dorsum of the left foot and the lower part of the leg. At the same time there appeared a purple discoloration of the skin of the thigh, abdomen, and arms (livedo reticulata or cutis marmorata). The tip of the nose, the ears, and hands became cyanotic and cold, and attacks of pain, itching, and formication occurred in the latter. Microscopical examination of excised portions of the skin showed the existence of obliterative endarteritis of the smaller vessels, with aneurysmal dilatation and rupture of the capillaries (purpura). The syphilitic basis of the disease was recognized late in the case and it became necessary to amputate the right foot. In the opinion of the author this would probably have been rendered unnecessary had an anti-syphilitic treatment been resorted to earlier. Raynaud's disease is due to several possible causes. Hutchinson in 1884 is said to have reported the first syphilitic cases [? ed.] and since that date numerous authors have reported cases lending support to the hypothesis. Thus a considerable number of cases are described in which the symptoms of Raynaud's disease were associated with signs of hereditary syphilis in children, with syphilitic endarteritis of the extremities, or with a positive Was-

serman reaction. Parkes Weber reported Raynaud's disease associated with livedo reticulata, which indicated a syphilitic basis. A somewhat similar case has come under Vignolo-Lutati's observation; livedo reticulata and purpuric patches were present, and the disease yielded to anti-syphilitic treatment.

Terson, A. ERYTHEMA AND OCULAR SYMPTOMS. [Paris Méd., Vol. 9, No. 36. J. A. M. A.]

Terson remarks in concluding this study of polymorphous erythema, that almost all affections of the eyes have a number of factors, even in the specific cases. General causes and occasional causes coöperate to induce the morbid condition. In certain cases of iritis and choroiditis no treatment seems effectual until the teeth are put in order, or the liver is treated, or the diseased urethra or uterus. Sometimes a vigorous purge will be followed by the complete subsidence of a conjunctivitis that has been showing but slight improvement under local measures. Dianoux has reported the powerful adjuvant effect, actually curative, of acetylsalicylic acid in a typical syphilitic iritis. He cites Manlio's case of a woman of 51 who had eleven attacks of nodose erythema and in two of them, about the fourth day, subacute glaucoma developed, requiring an emergency iridectomy and cured by this, Terson regards acute glaucoma as an identical process with acute edema of the lung. It induces hypertony because the means for excretion and exosmosis are so scanty. General pathology thus explains and identifies glaucoma. Le Couëdic has reported a case in which glaucoma alternated with arthritis, and once there was an attack of acute edema of the lung.

Hauduroy, P. PAGET'S OSTEITIS. [Plus-Ultra, Vol. 2, No. 8.]

This is a careful roentgen study of a severe case of deforming osteitis of the legs. His patient was a man of 64 with nothing to suggest acquired syphilis. Certain features of the case history point to a possible inherited syphilis. No discussion of the personality is given nor of the vegetative nervous characteristics.

Ferrannine, A. VEGETATIVE NERVOUS SYSTEM AND TUBERCULOSIS. [Rif. Med., 1919, No. 8. J. A. M. A.]

Ferranini remarks on the rapidity of the reaction to stimuli of different kinds in the tuberculous, demonstrating the extreme excitability of the nervous system. The reaction is not only exceptionally prompt but it is also exceptionally intense, and it reaches its maximum sooner than under other conditions. On the other hand, the reaction is exhausted sooner, and the tonic capacity is less. Various laboratory instruments record these findings, showing the "impulsive" character of the reactions in the tuberculous, along with their hypotonic and

hyposthenic character, as an aid in differential diagnosis. The toxins are responsible for this extra excitability of the nerves, and this in turn affects the endocrine system, or vice versa, with a resulting vicious circle. To this must be added toxic irregularities in growth, especially of the nervous system. For example, the normal growth of the brain may be exaggerated, and it may pull up the spinal cord and its roots, and this ascension of the cord may be rendered more injurious by an exaggerated growth of the vertebrae. The spinal roots then are stretched and compressed, with obvious injury. Such findings in the young may turn the scale in dubious cases. Even in adults, they may give the clue when we reflect that with advancing age the nervous system normally tends to display just the opposite characteristics. Irritable weakness at any age should warn of possible tuberculosis.

Gunderson, E. POSTINFLUENZAL VAGUS NEUROSIS. [Norsk. Mag. f. Laeg., June, 1919.]

Commenting on the present tendency to refer a host of symptoms to disorders of the vegetative system, and to diagnose vagotonia on slender evidence, submits that the diagnosis of a vagus neurosis rests on a comparatively sure base in the case he described. A medical student, aged 20, contracted influenza in October, 1918. In spite of fever, headache, sore throat, and general malaise, he remained up and about for a week. He went to bed when he felt pain in the left side of the chest. The pulse was now 88 and regular the temperature was not raised, but he perspired freely and felt hot. The heart and lungs appeared to be healthy. He had got to bed again, after being up for a short spell, when he suddenly felt stabbing pain in the region of the heart, whence it radiated to the left scapula. At first the heart seemed to stop beating; then it beat very slowly and feebly. Arms and legs shook violently, and he felt very anxious. He also felt unable to breathe deeply. This, the first attack of a series, was the most severe. A phenomenon that recurred with considerable regularity during these attacks was the development of a tumor in the left epigastric region. Its development coincided with colicky pains, and it was palpable as long as the attack lasted. With the cessation of the attack the tumor vanished at the same time as borborygmi were heard and wind was passed, at first by the mouth, later by the rectum. The first medical attendant diagnosed hysteria, and informed the patient accordingly. During subsequent attacks the pulse, which was otherwise about 70, fell to 55; there was tremor of the eyes when the lids were closed, vision was imperfect, and he could not swallow owing to a sensation of constriction in the throat. After an attack he passed much urine. The blood pressure was 105 to 110. After these attacks had lasted a fortnight he was reduced to a state of considerable nervousness, and their onset, which had originally been spontaneous and instantaneous, became dependent on certain exciting causes, such as a thrilling cinema show. A few days after the

prescription of bromide and atropine the attacks ceased altogether. The author notes the similarity of this case to the clinical picture of tympanismus vagotonicus drawn by R. Bálint. [B. M. J.]

Alvarez, W. S. PERISTALSIS. [Journal A. M. A., Nov. 8, 1919.]

The author says that the fundamental question in gastro-enterology is the cause of the propulsion of the food and excreta through the intestinal tract. He asks, for example, what could the heart specialist do in treating arrhythmias until Gaskell, McWilliams, he and others showed where the beat normally arises and how it is transmitted from sinus to ventricle. We should take hope from this good fortune that has come to our confrères, he says, and follow their method of study. We should study the gastro-intestinal tract in the embryo and in the lower forms of life, the reactions of the muscular coat—its rhythmicity, irritability, etc.—and stop thinking in terms of plumbing and rigid tubes held in one position. Alvarez says: "Six years ago I showed that there is a very definite gradient of rhythmicity in the muscle of the small intestine from duodenum to ileum." It seemed to him then that this might be the essential factor in determining the direction of peristalsis, and in two papers he reviewed much of the literature and showed how many clinical and roentgenologic observations could be explained by accepting this idea. During the past two years he has been able to show that there is a definite gradient of oxidation and carbon dioxid production in the intestinal wall underlying and probably giving rise to the lesser gradients of rhythmicity, tone, etc. Theoretically we can speed up these processes or reverse them. The chemical processes of life, it would appear, go on faster in the duodenum than elsewhere, and if they could be speeded faster in the other portions the process might be reversed. Recent study has shown that the local life processes are greatly speeded up by inflammation, so that it may be that the hypermotility seen in many cases of duodenal ulcer and cholecystitis, and the hypomotility with appendicitis, may be thus explained. There is another and perhaps more important way of reversing the gradient—by disease toxins. There is considerable evidence that these have such an effect on the heart, and the disordered heart action with digestive disturbances seen existing together after certain infections, such as influenza, may be also thus explained. The author is hoping that further studies of the subject will be richly rewarded.

Samaja, N. RAYNAUD'S DISEASE DUE TO MALARIA. [Gazz. degli Osp. e delle Cliniche, Milan, 1919, N. 16.]

In this casuistic contribution the author describes a soldier who developed Raynaud's disease, with symmetrical asphyxia of the fingers and toes, immediately after ten months' duty in a malarial area (Mon-

falcone). The patient was anemic and thin, and had never had malaria; but his spleen was enlarged and the blood showed 29 per cent. of mononuclear leucocytes. The attacks of arterial spasm came on every morning, and lasted a couple of hours regularly; the condition was cured in a few days by the administration of six grains of quinine hydrochloride thrice daily.

2. ENDOCRINOLOGY.

Mann, F. C. THE EFFECT OF SPLENECTOMY ON THE THYMUS.

The purpose of the research was to determine whether or not splenectomy produced any changes in the thymus. Previous work is very contradictory in regard to this question. Observations were made on dogs, rabbits and goats. The spleens were removed from the adult and young animals of these three species. The operation was performed under ether anesthesia, employing the usual sterile technique. At various times after removal of the spleen, the thymus was examined. If any of the gland was found to be present, it was fixed and carefully weighed twenty-four hours after fixation.

It was quite frequently possible to employ a whole litter of animals for the work, some of which were splenectomized and others left for controls. Observations showed that in the adult animal, no greater amount of thymic tissue was noted after splenectomy than in the normal controls. However, since the thymus regresses early in life, the most conclusive data on the effect of splenectomy on this organ were obtained with the use of young animals. No evidence was obtained that splenectomy is followed by either a hypertrophy of the thymus or a more early regression of this organ. It was impossible to show that there was any definite relationship between the spleen and the thymus. [Author's abstract.]

LaMer, Victor. METABOLISM AND SEX DETERMINATION. [Letter to Jl. Am. Med. Assoc., Nov. 1, 1919.]

A recent editorial (Jl. Am. Med. Assoc., Aug. 23, 1919, p. 612) emphasizes the relationship obtaining between basal metabolism and sexual expression, as evidenced by Miles' account of the diminished sex activities of a group of men on a reduced ration experiment. As Miles intimates these results have been foreshadowed by Riddle. Riddle (Theory of Sex, Science, N. S. 46: 19-24 [July 6] 1917; J. Washington Acad. So. 7: 319, 2, 1917, for references to earlier papers) has revived the metabolic theory of sex through extensive experiments on pigeons in which he has affected the metabolism of the germs (egg yolks) through such measures as reproductive overwork and hybridity, thereby producing abnormal sex ratios, while the dietetic factor has been held constant. (An excess of females is produced by overwork, and an excess of males from wide crosses.) He has further shown that when

these sex reversals take place they are quantitative in nature (as measured by sex behavior and gonad size), just as chemical and calorimetric analyses of the ova show quantitative changes in the storage metabolism, coinciding with the severity of the method used to produce the change in sex ratios.

Drummond (*Biochem. J.* 12: 25, 1919) has observed in his feeding experiments that when rats are kept on a diet deficient in water soluble B (vitamin) that the males exhibited a lowered sex activity, and indeed were sexually impotent, the testes showing degeneration. More recently Osborne and Mendel (*J. Biol. Chem.* 38: 223, 1919) have observed that when yeast is given to rats as the only source of protein and water soluble B, the males thus fed, although grown vigorously to adult size, were with very few exceptions sterile.

R. McCarrison (*Indian J. M. Res.* 6: 275 [Jan.] 1919; 550 [April] 1919) has measured the changes in weight of the organs of pigeons on diets adequate except for water soluble B. His results are based on seventy-two control and 168 experimental pigeons, and the data show that the testes lose 93 per cent. of their weight, while the ovaries lose only 69 per cent. In simple inanition when the birds die in twelve days or less, the loss in testes weight is 61 per cent. against 11 per cent. for the ovaries.

The nutritive deficiencies mentioned seem to affect the testes much more than the ovaries.

That the experiments also permit of a metabolic explanation seems evident from Dutcher's recent work: He has been able to alleviate, to a considerable degree, the symptoms of beriberi by therapeutic agents such as thyroid extract, tethelin and pilocarpin, which are known stimulants of metabolism.

It seems highly improbable that water soluble B, per se, is necessary in the formation of reproduction tissue, else we should expect to find it in these organs, but it is lacking. A more likely explanation is that its deficiency results in a level of metabolism insufficient for the differentiation and maintenance of male reproductive tissue, and if this level is sufficiently reduced, also for ovarian tissue.

That a change in metabolism due to internal secretions may convert differentiating ovarian tissue into testicular tissue has been brought out most beautifully by the work of Tandler and Kellar, and of Lillie in their studies on the freemartin, in which the hormones of the male fetus circulate through the female fetus, owing to an anastomosis of the blood vessels. If the juncture occurs later in fetal life, the female exhibits only masculine secondary characteristics and sterile ovaries; if earlier, the ovary itself contains testicular tissue, and it is probable that in cases in which the testicular hormone circulates through the female previous to the development of the ovary, a complete sex reversal may be effected.

But the effect of diet on sex is not restricted to a change in second-

ary sexual characteristics of the differentiated organisms, for if it is applied properly it can effect a true reversal of sex. As Lusk and others have shown that the ingestion of an abundant diet, and of protein foods in particular, leads to an increase in metabolism (specific dynamic action), we should expect that a change in diet which would yield a higher metabolic rate should also result in an increased production of males; and, indeed, such has been found to be the case in the lower forms of life.

Whitney, and Schull and Ladoff (J. Exper. Zoöl., series of papers from 1914 on), demonstrated in *Hydatina senta* that it is the diet acting on the grandmother which determines the sex of the grandchildren. A continuous diet of the colorless flagellate, *Polytoma*, causes female grandchildren to be produced; and when an abundant supply of the active green flagellate, *Dunaliella*, is supplied, approximately 95 per cent. of the daughters became male producers. This work has been confirmed on five species of rotifers, and in every case the giving of an optimum food and in greater abundance has yielded similar results.

It may properly be asked at this point why it is, then, that feeding experiments on mammals with this object in view have in some cases yielded apparently positive results, but perhaps even more frequently negative results, so that the effect of nutrition and, in truth, the metabolic theory, have until recently been discredited among scientific men.

In answer to such criticisms it seems well to point out that Nature has protected herself against the effects of sudden change in sex ratio by environmental causes by setting aside an organ (the ovary) which resists any change in its metabolism except by unusual or prolonged pressures. The results in rotifers show that the diet does not affect the sex of the daughter, but one of the ova which are to differentiate and develop in the daughter's ovary. How, then, are we to expect significant changes in the sex ratios of higher forms in which the metabolism is more stabilized through the agency of internal secretions, by performing a feeding experiment lasting only a comparatively short time on, at most, a single generation? Riddle has been successful in the first generation, because his methods attack directly the metabolism of the ovary and the developing ova both previous to and during the chromosomal maturation period; and it is for this reason, in addition to others, that he has been compelled to abandon the chromosome theory as a causal explanation of his results. He considers the sex chromosomes as associated phenomena in the determination of sex, developed possibly for the maintenance of the necessary metabolic levels.

The evidence at present would seem to indicate that the older experiments designed to test the nutritive factor must be repeated in view of our newer knowledge of nutrition relating to the physiologic values of the different amino-acids and the rôles played by the vitamins or food hormones. By approaching the problem in this manner we may possibly hope to explain the varying sex expressions of the different

nationalities and the changed sex ratios which seem to follow war. [Author's abstract.]

Moore, C. R. THE GONADS AS CONTROLLERS OF CHARACTERISTICS. [Journal of Experimental Zoölogy, Vol. 28, No. 2, May 20, 1919.]

C. R. Moore discusses the question of the physiological properties of the gonads as controllers of somatic and psychical characteristics in the rat. This is only a preliminary attack on the subject, as a fuller discussion is being reserved until his results with guinea-pigs can be finalized. Moore's studies have been entered upon in order to test out Steinach's experiments and ideas concerning this subject. Steinach has reported that an ovarian graft in a completely castrated young male rat or guinea-pig will so modify subsequent development that the animal becomes somatically and psychically a female. It is proportionately lighter in weight, shorter in body length, hair finer and smoother and pelvis smaller than in normal males of the same age. They are more docile, there is an absence of male instincts towards female rats and their actions towards young are characteristically that of a mother. In the reverse experiment of grafting testicular tissue into completely spayed young females, the animals become masculinized as maturity is reached. It was supposed that a secretion from the interstitial cells of the grafted organ in each case is the controlling factor, since the secondary characteristics of the opposite sex do not appear, unless the implanted gonad obtains vascular connections and remains in a living condition after the transplantation. In addition to following Steinach's technique in these homoplastic transplantations, Moore prepared controls and variations such as castration and spaying without subsequent transplantation, which transplantation was made without disturbing the normal gonad. As a result of his experiments, Moore states that weight and body length, being but poor criteria of maleness or femaleness under abnormal conditions, they are therefore unsatisfactory for determining changes associated with cross transplantation of gonads. As regards changes in the hair, mammary glands, skeleton and fat deposit, Moore finds that they are liable to so many variations that they cannot be safely used as indicators of changes in sex characteristics. However, observation on the behavior of these rats has given much evidence in support of the idea that the sex gland regulates the characteristics of the animal. It is beyond question that the early castrated male rats, which have received implanted ovaries (feminized males), display a maternal behavior to the young. They enter the nest with or without the mother, nestle the young and repeat exactly the mother's behavior when the young attempt to suckle, this latter being a very definite and characteristic action. The normal male and masculinized females seldom, if ever, went near the nest and took no interest in the young. As regards the masculinized female, attempts were made

by them to imitate the male in the act of copulation in an absolutely typical set of reactions, such a thing having never been observed among normal female rats. Thus, the only observations of any value in corroboration of Steinach's experiments appear to be psychical, as evidenced by sexual reactions and maternal behavior of the rats. [Med. Jl. Austral.]

Davis, Thomas K. STATUS LYMPHATICUS: ITS OCCURRENCE AND SIGNIFICANCE IN THE WAR NEUROSES. [Amer. Archives of Neurology and Psychiatry, Oct., 1919.]

The author considers that the following signs constitute the so-called status lymphaticus state: bodily hypotrichosis in contrast to abundance of hair on the scalp, feminine type of pubic hair, velvety skin, a tendency toward abnormal length and narrowness of the thorax and slenderness in the long bones. He mentions that in the male these signs are evidence of endocrinal abnormality and constitute a partial heterosexualism.

Two groups of soldiers returned from the American Expeditionary Force were studied as regards the occurrence in each group of these "status" cases. Among 119 wounded soldiers the "status" type was found in 12.60 per cent., while among 114 soldiers not wounded, who had instead developed a psychoneurosis in France, the "status" cases were found to be almost twice as frequent (23.68 per cent.).

The author believes that these figures indicate that endocrinal abnormality increases susceptibility to the development of a psychoneurosis and, secondly, that since endocrinal abnormalities are chemical and physiologic it should remind us to emphasize the physiologic factor in the etiology of the war neurosis. On the other hand, because of the known association between status lymphaticus and certain psychopathic tendencies these figures bring new proof of a physical character, of the conception, that in the war neuroses, an initial weakness operative in the physical field, is essential. [Author's abstract.]

Apert, E., et Decléty. UNILATERAL GYNECOMASTIA FOLLOWING INJURY TO THE SCROTUM. [Bull. et mém. Soc. méd. d. hôp. de Par., 42, 1918, 1091.]

Unilateral gynecomastia resulted in a soldier apparently resulting from a penetrating wound of the scrotum.. They refer to other cases in which this type of gynecomastia had developed after injury to the testis, usually on the same side. In these the injury was slight and had not amounted to destruction of the testis. In unilateral castration or extensive lesions of the testis this result does not occur. The occurrence of the gynecomastia is attributed to the action of the vegetative nervous system influencing the hormones regulating mammary development. The breast on removal they state did not show any patho-

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logical changes, but the report of the findings shows the usual results of cutting the autonomic influences thus causing imbalance of the sympathetic mechanism with increase in cells and fibers as Timme has shown for the stomach. [Ed.]

Park, E. A., and McClure, R. D. RESULTS OF THYMUS EXTIRPATION IN THE DOG. REVIEW OF EXPERIMENTAL LITERATURE ON THYMUS EXTIRPATION. [American Journal of Diseases of Children, Chicago, November, 1919.]

In this typically dogmatic and uncritical—superficially extremely profound study—Park and McClure report in detail the results of their own observations made on dogs. They believe they have shown that thymus function is absolutely unessential to life [dog's life, may be, not to other types of life—but what do they know even of a dog's life, *i.e.*, the dog's feelings—rather than a limited review of his limited actions]. They state there are other explanations than deprivation of thymus function for the symptoms and pathologic changes which have been reported in thymectomized animals, and that those explanations must be considered seriously in the interpretation of all positive experimental findings, and, further, that for the interpretation of the positive experimental findings reported by some investigators those explanations become absolutely essential. In putting valuations on the results which have been obtained by means of thymus extirpation, the greatest importance must be given to the fact that the symptoms and pathologic changes which have been ascribed to deprivations of thymus function are almost without exception the symptoms and pathologic changes which occur in laboratory animals as the result of confinement, improper food, unhygienic conditions, bacterial and parasitic infections and are identical with or closely related to those which have been reported after the removal of at least two organs of internal secretion in addition to the thymus, after excision of the carotid bodies and after a number of different abdominal operations. The authors were unable to affirm the claims of other workers that extirpation of the thymus produces any detectable alteration in the hair, teeth, contour of the body, muscular development, strength, activity or intelligence of the experimental animal. Extirpation of the thymus probably does not influence growth or development. The possibility that it may cause retardation in development and delayed closure of the epiphyses, however, cannot be excluded absolutely. Extirpation of the thymus probably produces no alterations in the organs of internal secretion. It is possible that it produces well marked changes in the organs of internal secretion in the period immediately following thymectomy which was not covered in these experiments.

Morquio, L. TUMOR OF PINEAL BODY. [Arch. Lat. Am. d. Pediatria, No. 2, 1919.]

In this case a child of twelve who has never been ill falls after a slight prodromus into a meningeous tableau: cephalalgia, vomits, constipation and tendency to sleep. This state continues with slight alterations during a fortnight till his entrance to the hospital. We see, then, that besides the subjective symptoms already mentioned, rigidity of the nape of the neck, Koernig's sign, exaggeration of the reflexes, hyperesthesia, motor-vessel disturbances, etc., all of this inclined us towards the tuberculous meningitis diagnosis by its prolonged and slow progress. But the examination of the cephalo rachitic liquid, did not show any alteration, obliging us not only to doubt but to modify our diagnosis, in a way that did not seem easy. Sometimes we thought of a hysteric or a simulator. This state goes on in the same way, accentuating the phenomena of physic and mental asthenia, generally without temperature, with yawns, sighs and somnolence each time more marked.

The spinal puncture, repeated five times, was always negative, the liquid did not offer any modification which eliminated any alteration of the meninges. The Cobayo's inoculation was completely negative.

The Wassermann's and the tuberculin reaction were also negative. Only the radiograph showed some alteration of the sella turcica corresponding to a tumor of the hypophysis that was not confirmed on the necropsy. The child died after a month of illness in a progressive comatose state and on autopsy we found a tumor of the pineal gland, possibly of embryonic origin with cystic and sarcomatous degeneration that should explain its very slow or latent evolution, perhaps congenital, and its rough waking with a short term's progress. The details of the observation exempt us from further explanations and even when we eliminated the meningitis, we suspected some brain alteration. We did not think of a localization of the pineal gland, on account of the complete absence of the manifestations that according to Bailey and Jelliffe mark this gland's tumors, and of its rapid evolution, as if it were instead an acute inflammatory process, in a somnolent form, that offered great likeness to the lethargic encephalitis, of which we have spoken in a recent communication. [Author's abstract.]

Holmes, G. W., and Merrill, A. S. THYROTOXICOSIS. [J. A. M. A., Nov. 29, 1919.]

Notwithstanding the amount of literature on the subject, the treatment of exophthalmic goiter by the roentgen ray has not received due attention in many clinics, according to these observers. Investigations and experimental work have shown that the glandular structures can be destroyed after a sufficeint length of time by the roentgen ray or radium. It is also generally known that the action of this form of light is most destructive on the higher organized type of cell and that

the tissues of the lymphatic system are particularly vulnerable. Anatomically, the thyroid gland is somewhat allied to the lymphoid structures, and changes in it are often accompanied by thymus enlargement. Admitting these statements and that the amount of irradiation sufficient to destroy the thyroid gland is not such as to injure the skin, we ought thus to be able to remove part or all of the gland by this means and have results equal to those of surgery, without its dangers. The authors review the literature of the subject which to them proves that such results are possible, especially the conclusions of Pfahler and Zulick, and those of Means and Aub in *The Journal of the American Medical Association*, July 17, 1917. Studying the case histories, they have classed their own patients as follows: "1. Patients in whom very definite benefit ensued, apparently as the result of the treatment, and are clinically well. 2. Patients in whom there was definite improvement but who still manifested some evidence of the disease. 3. Patients in whom there was no change under treatment or who became definitely worse. 4. Patients in whose cases fairly complete data were obtained, at least one basal metabolism record was made, and sufficient time had elapsed to warrant a definite opinion as to the final result. The cases in this group are selected from the other three." One hundred and thirty-three patients have been received for treatment who are not included in these groups because of insufficient data. There are thirty-four patients in Group 1—three males and thirty-one females. Two had previously been operated on without complete relief. The number of treatments ranged from three to thirteen, averaging about seven. In some cases the exophthalmus persists, but the thyrotoxicosis is absent. When a record of metabolism was made it showed a sharp drop in most cases, and this was also true of the pulse. There were sixty-eight (Group 2) improved—three males and sixty-five females. The records are not altogether complete in the earlier ones, but all of them had been referred for treatment for hyperthyroidism. In Group 3 (unimproved or bad results), there were fourteen patients—all women, none under twenty years of age. The diagnosis was possibly incorrect in two. One died following the operation which was resorted to. Two died from intercurrent disease, and six had less than the required number of treatments. In one case, myxedema developed, possibly as a result of overtreatment. Group 4 comprises a fairly complete study of thirty-six cases, all tested at least once for metabolism and some before, during and after treatment and the final observations made by a disinterested clinician. Of these, seventeen were perfectly well, and thirteen were improved, making a total of thirty definitely benefited. In four, the diagnosis was proved incorrect,—one was operated on without relief, two had recurrences which responded to further treatment, and in one myxedema developed as result of overtreatment. The results are shown in tabulated form in the article. The methods were somewhat varied the first two years but, later, fairly constant. "Most of the work was

done with an interrupterless machine, Coolidge tubes being used. The parallel spark was approximately 8 inches. The rays were filtered through 4 mm. of aluminum and 1 mm. of leather. The target skin distance was 8 inches. Three areas were treated at each sitting, each area receiving two thirds of an erythema dose." The treatment should be applied to both thymus and thyroid regions, fairly hard rays should be used, and the treatment should not be repeated until three weeks have elapsed. The series should include two or three treatments following one another, and then an interval of three months, making nine treatments altogether. Consequently during this time, the patient will have been under observation about one and a half years. Bad results are less severe than from surgery, the undesirable features being hypothyroidism, telangiectasis and atrophy in the regions treated. But these can usually be avoided by using heavy filters and keeping well below the erythema dose. The importance of the study of basal metabolism before, during and after treatment is emphasized both for diagnosis and as a control of the amount given. The authors believe that the roentgen ray and rest should be tried in all cases for a sufficient length of time before resorting to surgery.

Levy, Louis. MAKING THE TREATMENT OF GOITER SAFE. [New Orleans Medical and Surgical Journal, October, 1919.]

Levy thus describes his operation: After novocaine infiltration, the usual necklace incision is employed (an incision corresponding to a line where a string of beads would cover it if put on the neck). The skin, superficial and deep fascia, and platysma are dissected up to a point well above the gland, exposing the sternohyoid and the sternothyroid, the inner portion of the sternomastoid and the omohyoid. In medium sized growths, muscle separation will permit of the delivery of the tumor. The muscle section of the sternohyoid and thyroid group, if made, should be near their upper attachment, so as not to interfere with their nerve supply. After the removal of the gland the severed muscles are carefully united by suture. The upper section also permits of early ligation of the superior thyroid artery. The tissue covering the gland is then divided down to the true capsule of the gland, the gland elevated and brought into view and removed from above and behind, the object being to allow the posterior capsule, with a small part of goiter tissue, to remain. After exposing it the upper pole is elevated and the superior thyroid artery is cut between forceps. Forceps are then clamped in twos along the posterior capsule, always remembering to include a portion of the capsule with the goiter tissue. If this is not done, unnecessary bleeding occurs, as goiter tissue itself seldom hold forceps. The capsule is followed down and seized between forceps until only the posterior capsule and the small amount of goiter tissue remain. The capsule then may be sutured over and perfect hemo-

stasis secured. The tissue capsule is then sutured over the goiter capsule, more completely establishing perfect hemostasis. The muscles, if they have been cut, are now sutured. The same operation is done on both sides, and, if the capsule is closely followed, the recurrent laryngeal is never injured, the parathyroids seldom seen, and the isthmus not touched. The skin is now brought down and sutured with interrupted sutures and Michel clamps. Drainage may or may not be employed, but in most drainage is not used. After operation, with the principle of anociassociation still in mind, morphine is used, not by doses, but by result. Goiter patients must be kept absolutely quiet, even if respiration has to be brought down to twelve a minute for the first three days. After leaving the institution, patients should have continued rest, quiet and congenial occupations until all vestige of toxicity disappears, and nearly all patients can then lead normal lives.

II. SENSORI-MOTOR NEUROLOGY

1. PERIPHERAL NERVES.

Joyce. A STUDY OF PERIPHERAL NERVE INJURIES. [British Jour. Surg., 1919, vi, 418.]

Joyce here presents an extensive study of 150 cases of war injured nerves. He has not seen any case of complete physiological division later than twelve months after injury in which the condition was not a complete anatomical section. On the other hand, many cases with palpable spindles on their nerves have been seen with full and complete recovery. Cone made a series of remarkable experiments, from which he concludes that war injured nerves are ready to unite at both ends of the injury before the end of eight months. Joyce's cases seem to confirm this. Joyce concludes that: In the majority of cases delayed end-to-end union of a divided nerve is successful, and this method of repair is that of choice. There is something to be said for reunion of nerve trunks by suture of bulbs. An appeal to results of cases so treated is the only way of settling this important matter. This is being done. The anatomical continuity of a nerve deserves the greatest respect. Exploration of a physiologically completely divided nerve should be done as soon as the condition of the wound permits. Neurolysis combined with capsulectomy of spindle-shaped neuromata has been followed by recovery in most, and improvement in all, cases in which this has been done. Exsection of a spindle-shaped neuroma is not justified unless failure has resulted from a neurolysis capsulectomy. Nerve transplantations and double lateral implantations of the ulnar into the median in the forearm have been followed with some measure of success, including some recovery of voluntary power in the affected muscles; but recovery is slow and uncertain. Nerve growth takes place from both ends of a divided nerve transplant, but axis-cylinders grow

down only from the central end. An autogenous nerve transplant, of smaller size than the nerve into which it is planted, is capable of hypertrophy. Axis-cylinders, judged by Tinel's sign, grow at the average rate of 2 mm. per diem. Perineural scar tissue constricting young axis cylinders is the most important factor in hindering recovery.

Hartman, F. A., Blatz, W. E., and Kilborn, L. C. STUDIES IN THE REGENERATION OF DENERVATED MAMMALIAN MUSCLE—I. VOLUME CHANGES AND TEMPERATURE CHANGES. [Journal of Physiology, 1919.]

The volume and temperature changes immediately following denervation were studied in the cat with the following results:

VOLUME CHANGES

1. The maximum dilatation of the limb occurs from two to six hours after denervation. The extent of this dilatation is probably a little more than 2 per cent. of its total volume.

2. In some individuals, constriction of the denervated limb begins soon after the point of maximum dilatation has been reached. In others constriction may not begin for a few hours after this time.

3. Complete recovery of the original volume occurs in many cases within twenty-four hours. There may be an over-recovery of the original volume as time goes on.

4. Constriction of the denervated limb may take place without a proportionate lowering of the limb temperature.

TEMPERATURE CHANGES

1. The duration of the increased temperature resulting from denervation is exceedingly variable.

2. In many cases there is an over-recovery of the temperature. This occurs from a few days to several weeks after denervation.

3. Increased circulation and fibrillation do not seem to account entirely for the maintained supernormal temperature of a denervated limb.

Hartman, F. A., Blatz, W. E., and Kilborn, L. G. STUDIES IN THE REGENERATION OF DENERVATED MAMMALIAN MUSCLE—II. EFFECT OF MASSAGE. [Journal of Physiology, 1919.]

The soleus, gastrocnemius and plantaris muscles were denervated on both sides in thirty-seven rabbits. The muscles of the right side were massaged from two to ten minutes a day over periods varying from seven to one hundred and ninety days. At the conclusion of the experiment the work capacity of the treated muscle was compared with that of the control.

This was done by putting the animal under an anesthetic and dissecting out the muscle groups to be tested with as little disturbance of the circulation as possible, attaching the tendon of Achilles to a lever. The power of the muscle was then determined by recording the height of contraction against definite loads when stimulated by single shocks. In this way the work curves of both the treated and control muscle-groups were made. Finally the two muscle groups were removed from the limb and weighed.

The treated muscles were stronger than the controls in sixty-two per cent. of the animals. There was considerable discrepancy between the comparison by weight and the comparison by function.

In view of our ignorance of the relative capacities of the two sets of muscles before beginning treatment, a small predominance of power in the treated muscles is inconclusive.

The work capacity of the flexor muscles on both sides was compared in fifteen normal rabbits. Sixty per cent. of these animals possessed stronger muscles on the left side.

In the cases of left preponderance the difference was much greater than in the cases of right preponderance. A large proportion of the left muscle groups were also heavier than the right, although such muscles did not invariably prove to be the stronger.

The results of this research do not point to great benefit from massage in the case of denervated muscle. This is borne out by a more comprehensive research which is ready for publication. [Author's abstract.]

Pollock, Lewis J. SUPPLEMENTARY MUSCLE MOVEMENTS IN PERIPHERAL NERVE LESIONS. [Jour. Amer. Med. Assoc., Nov., 1919, Vol. II., 518.]

Major Pollock here comments on the frequency with which more than one muscle may produce a similar movement of the segments about a joint and emphasizes the necessity for the use of great care in the analysis of all muscle movements. This care is the more necessary in the study of peripheral nerve lesions because the muscles under consideration may receive their nerve supply from different sources. The preservation of certain movements, the loss of which is supposed to follow particular nerve lesions has been observed for many years. These movements may be caused by a number of factors. Among these may be included the anastomotic supply of muscles from adjacent nerves, movements produced by muscles other than primary movers in this action, movements occurring as the result of mechanical factors producing a change of direction of leverage by shortening and lengthening of tendons and muscles passing over several joints, and slight movements resulting from the recoil of elastic tissue following a movement in a direction opposite to the one desired.

In a musculospiral palsy it is possible to tense the proximal phalanges of the fingers by extending the terminal phalanges; at the same time flexion of the proximal ones occurs, as the result of the unopposed action of the lumbricales. Slight passive extension of the proximal phalanges may be produced by flexion of the hand at the wrist. Simulation of extension of the first phalanx of the index finger is frequently accomplished by strong adduction and opposition of the thumb against the first phalanx of the index finger, which is thereby passively lifted dorsally.

In a lesion of the musculospiral nerve with paralysis of the extensors of the wrist dorsiflexion of the hand may be produced by the action of muscles not innervated by the musculospiral nerve. Dorsiflexion of the hand may occur in the course of energetic contraction of the flexors of the fingers.

In some cases strong contraction of the pronator radii teres will produce extension of the hand on the forearm. During this movement the head of the radius is strongly depressed toward the palm, the styloid process of the ulna is pulled dorsally and the hand is deviated to the ulnar side.

At times in addition to the contraction of the pronator, there is seen strong adduction and opposition of the thumb against the proximal phalanx of the index finger. At the same time resistance to this action is made by the contraction of the lumbricale muscle, and the hand is extended on the forearm to a noticeable degree.

Contrary to expectations, section of the median nerve frequently is followed by but little disturbance in the flexion of the proximal phalanges of the fingers. This seemingly paradoxical condition is due to a number of factors. Flexion of the proximal phalanges of the inner two fingers is preserved because the lumbricales of these two fingers are supplied by the ulnar nerve. The fact that the flexor profundus digitorum for the middle finger may in some instances receive its nerve supply from the ulnar, I think explains the frequent presence of flexion of the first phalanx of that finger, inasmuch as the lumbricales have their origin in the tendon of the flexor profundus digitorum. If they are paralyzed, and especially if some contracture and shortening has taken place, contraction of the flexor profundus digitorum will produce a pull on the inert lumbricales and result in flexion of the proximal phalanx.

Flexion of the second phalanges of the inner two fingers occurs only a little weaker than normal as the result of the accompaniment of this movement to the normal flexion of the proximal and distal phalanges of these fingers. Flexion of the second phalanx of the middle finger is frequently present in this general flexor movement. First, because it is influenced by flexion of the ring finger, and second, because the flexor sublimis digitorum for this finger in some instances must receive some of its nerve supply from the ulnar. Flexion of the terminal phalanx

of the index finger is always absent. Flexion of the terminal phalanx of the middle finger may be present in those cases where the flexor profundus digitorum is supplied by the ulnar nerve.

Opposition of the thumb may be simulated by the action of the adductor pollicis and the inner head of the flexor brevis pollicis, with the terminal phalanges of the finger being opposed, flexed.

In ulnar lesions the imperfect flexion of all phalanges is the result of influence exerted on all segments when the flexor sublimis digitorum contracts. This is more marked in the little than in the ring finger.

Slight flexion of the proximal phalanx of the ring finger may be obtained from the contraction of the flexor profundus digitorum pulling on the lumbricale muscle which has part of its origin from the tendon of the profundus.

Although the interossei which extend the second and third phalanges of all fingers are paralyzed, inability to extend these phalanges in the index and middle fingers is rare.

The following factors enter into preservation of extension of the second and third phalanges: Innervation of the first and second dorsal interossei by the median, passive extension of the second and third phalanges by flexion of the proximal ones, thereby shortening the interossei. If the interossei are paralyzed and the lumbricales preserved, the pull on the interossei is straight and not angular; under these conditions, contraction of the extensor communis digitorum may exert a pull on the inert interossei and produce extension of the second and third phalanges. Some pull on the interossei may be exerted by the extensor communis digitorum even if these conditions are absent, as may be seen in combined ulnar and median nerve lesions.

In adduction of the thumb, as pointed out by Duchenne, the extensor longus pollicis is a prime mover, and in ulnar nerve lesions it may supplant the loss of the adductor pollicis. Abduction of the fingers away from the midline may result from forced extension of the first phalanges.

When the hand is adducted to the ulnar side, the tendon of the extensor indicis is so deflected that its contraction produces slight adduction of the index finger. In combined lesions of the ulnar nerves, Duchenne has pointed out that the extensor ossei metacarpi pollicis is a flexor of the wrist. [Author's abstract.]

Roussy, G., and Cornil, L. HYPERTROPHIC NEURITIS. [Ann. de Méd., September, 1919.]

Two forms of hypertrophic neuritis have hitherto been described: (1) The Dejerine-Sottas type, characterized by generalized muscular atrophy, with hypertrophy of the peripheral nerve trunks, lightning pains, ataxia, Romberg's sign, nystagmus, myosis, and the Argyll Robertson pupil. The anatomical lesion consists in a neuritis chiefly involving the interstitial tissue. (2) Pierre Marie-Boveri type. In this

type the muscular atrophy is more marked in the lower than the upper limbs, and the other features are kypho-scoliosis, exophthalmos, intention tremors, and scanning speech. Romberg's sign, ataxia, and lightning pains, are absent. The anatomical lesion in this type involves the nerve fiber as well as the interstitial tissue. A third type is now described by Roussy and Cornil, which differs from the Dejerine-Sottas type by its late onset, absence of Argyll Robertson pupil, myosis, nystagmus, and generalized muscular atrophy, and by the presence of an intention tremor, and from the Pierre Marie-Boveri type by the absence of a familial character, scanning speech, and exophthalmos, and by the predominance of a systematized muscular atrophy in the upper limb of the Aran-Duchenne type.

Valberg, M. RECURRING PUERPERAL POLYNEURITIS. [Nord. Med. Arkiv., Oct. 18, 1918. J. A. M. J.]

In the case reported by Valberg the woman of thirty-four had had the toxic polyneuritis return at each of her three childbirths, without a trace of it in the interim. Paresis of accommodation was a special symptom, along with the paralysis of all the limbs. These symptoms developed five weeks, three weeks or eleven days after the delivery, and they subsided completely in ten or eight months. The woman was otherwise healthy, and there was absolutely nothing to suggest exogenous toxic action. He has been able to find only seven similar cases in the literature, and only one of them is beyond question; in two the polyneuritis developed during the pregnancy. In the others, only the arms were involved. Valberg's own case was far the severest of all. He calls attention in particular to the similarity of the clinical picture in each attack; either the special nerves involved are constitutionally inferior or exceptionally susceptible to the neuritis-producing toxin.

Regan, J. C., and Silkman, A. TREATMENT OF RABIES. [Archives of Diagnosis, April, 1919.]

These observers state that the best method of treating bites of suspected rabid animals is by cauterization. Many of the commonly used agents, however, *e.g.*, phenol, silver nitrate, and the thermocautery, are objectionable in that they seal up the virus. Nitric acid is free from this objection, and is especially valuable in the cauterization of bites treated late; the "fuming" variety of acid should be used. Although many have asserted that to be effective cauterization must be performed within the first few hours, experiments show that certain caustics, notably nitric acid, are effective much later; nitric acid should be applied even up to the seventy-second hour after the injury. Before cauterization the wound should be squeezed to encourage bleeding and thoroughly washed with one in 1,000 mercuric chloride solution. A wet dressing of the latter should be applied after the cauterization. A

punctured wound that cannot be properly cauterized should be laid open with a scalpel. The bite should not be sewed up. Sutures already introduced should be removed and cauterization performed. In the Pasteur treatment nothing stronger than a three days cord need be used for ordinary bites; for face bites and extensively deep wounds two days cords are advisable. In a bite by a positively rabid animal, the patient should be advised to return for a second series of injections at the end of six months. This will avert the death from rabies after a prolonged incubation period which occurs in rare instances. In face bites or extensive wounds one of the authors has recommended repetition of the entire prophylactic treatment two weeks after completion of the first course. Publicity and proper Federal laws are essential for the eradication of the disease from the United States.

Semple, David. THE NATURE OF RABIES AND ANTIRABIC TREATMENT. [British Medical Journal, September 20, 1919.]

Semple reviews the several preparations used for the specific treatment of rabies, including the preparations of dried rabbit's spinal cord, diluted living and virulent virus, antirabic serum, and killed rabies vaccine. He points out that the first two methods are not free from objection on the basis of possible danger from the introduction of the living virus. The third method was extensively tried by the author, but was always followed by the use of one of the other preparations, so that it was not possible to state its true value. It seemed reasonable, however, to think that it was of some value in producing an immediate passive immunity while waiting for the development of an active immunity from the injection of one of the other preparations. This should be valuable especially in cases in which time is of great importance, since the active immunity is slow in developing, requiring nearly two weeks at the least. Finally, the author is a strong advocate of the use of killed rabies vaccine, prepared by treating the fresh emulsified cords of rabbits, dying from infection by fixed virus, with phenol for a sufficient time to destroy the virus. This preparation is free from the objection raised against the first two preparations, it is easy to make, and it keeps well so that it can always be available for use. Such a vaccine has been used by the author since 1912 in the treatment of more than 22,000 persons with only 0.68 per cent. of failures. Of these only 2,009 were Europeans, the remainder being natives of India who generally do not come for treatment so early as Europeans. Among the Europeans treated the failures were only 0.19 per cent., which shows the results to be quite as good as those obtained with any other preparation. Emphasis is laid upon the need for immediate treatment in every suspected case and the proper adjustment of the dose of the vaccine.

Freyer, P. J. HYDROPHOBIA EIGHTEEN MONTHS AFTER INFECTION.
[British Medical Journal, June 28, 1919.]

The author here presents the detailed account of a case of typical hydrophobia which developed eighteen months after the bite of a rabid dog. In analyzing this case the author concludes that it shows that the virus may remain active but dormant for a long period; that it remains in the region of the original bite, since that area became painful at the time of development of the active disease, and that in view of such a localization all bites which are at all suspicious should be thoroughly cauterized as promptly as possible, or if the wound has healed it and the surrounding tissues should be excised as a prophylactic measure.

Boisseau, J. THE FINGER ABDUCTION SIGN IN RADIAL PARALYSIS.
[Presse médicale, May 8, 1919.]

This paper states that when a patient with organic radial paralysis is asked to spread the fingers apart, the middle finger remains practically motionless while the distal phalanges of the second, fourth, and fifth fingers, are slightly flexed and the thumb is moved toward the ulnar side, instead of outward. In hysterical radial paralysis either the fingers all remain motionless or they spread out to a greater or less extent in one plane, as under normal conditions; if the fingers are spread out passively by the examiner and the patient told that he will be able to keep them spread apart himself he will usually succeed in doing so. In mixed, hysteroorganic cases the abduction sign allows one to state that the nerve injury has not yet been repaired or, on the other hand, if abduction occurs normally, that recovery has taken place. If the patient says at first that he is unable to spread the fingers apart, suggesting a hysterical paralysis, passive abduction should be tried. If the fingers then assume the abnormal position characteristic of radial paralysis, repair of the nerve injury is proved to be not yet complete.

2. CRANIAL NERVES.

Taylor, J. CHANGES IN THE SELLA TURCICA IN FAMILY OPTIC ATROPHY.
[Br. Jl. Ophth., May, 1919.]

A case is quoted of a man of fifty-two years (a member of a family afflicted with Leber's atrophy), whose vision suddenly altered and on examination revealed white discs and central scotoma for colors and changes in the *sella turcica* as shown by X-rays. This was long and shallow and the clinoid processes were abnormal. An X-ray examination of a brother of this patient, who was suffering from atrophy, showed similar and more extensive changes in the pituitary fossa. In this family the onset in several instances was very rapid. Taylor gives Fisher the credit of first suggesting that Leber's atrophy was dependent upon some condition of the pituitary, occurring, as it did, either at the time of sexual development or with the commencement of sexual decay.

White, G. M. ASSOCIATION AND COLOR DISCRIMINATION IN FISHES. [Jl. Exp. Zoöl., Vol. 27, No. 4, 1919.]

The results of a series of experiments undertaken to determine the ability of certain fishes to form associations and to discriminate colors and patterns are here recorded. Compared with land vertebrates fishes live in a constant medium where little premium is put on sensory specialization. Their behavior is stereotyped. Their associations are simple, few in number and are not readily modified, though they are often fairly permanent when once formed. Learning seems to consist for the most part in the gradual elimination of useless movements and the establishing of useful ones. There is little evidence of the formation of new types of movement. A considerable period of training in concentrating the attention upon the object in view seems to be necessary before association can be formed. Fishes do not seem to be capable of anything which might properly be called a concept, nor to exhibit memory in the sense of having ideas about absent objects. They do react more readily to present objects with which they have had experience in the past, particularly if this experience has been repeated several times. After some repetition of a reaction they form associations and habits. There seems to be no clear proof of the subordination of the individual's welfare to the general good of its kind nor any decided development of a social or gregarious instinct.

Arnold, V. OPTIC NEURITIS IN TYPHUS FEVER. [Wien. klin. Woch., September 4, 1919.]

Arnold here states that neuritis is a frequent complication of typhus. He found it in 59 per cent. of 244 cases. Thus it is a most valuable diagnostic sign. He excludes three cases in which the changes were limited to slight blurring of the margins of the disc, and includes only definite changes in the disc as evidence of neuritis. This is not definite until the eighth or ninth day of the typhus and is usually noticed on the tenth to twelfth day. As the rash has often vanished, the optic neuritis is a needed aid to the differential diagnosis of typhus and typhoid fever. The author has examined the fundus of one hundred typhoid patients without finding optic neuritis. This sign seldom lasts long; in many cases a fall of the temperature to normal is quickly followed by the complete disappearance of the neuritis. But it may last longer and be present weeks and even months. Children and adults under fifty are most likely to develop optic neuritis; it is comparatively rare after fifty years of age.

Cabannes. UNILATERAL MYDRIASIS. [Jl. d. Med. d. Bord., July 10, 1919.]

Mydriasis, according to this study, may result from paralysis of the sphincter or from inertness of the retina. These conditions can be dif-

ferentiated from unilateral mydriasis by the pupil of the non-mydriatic eye contracting in a bright light if the eye in mydriasis has good light perception. The crossed reflex contracts the pupil of the opposite side. When no miosis on direct exposure to a bright light is present then no crossed reflex is present which demonstrates that vision is lost in the eye with the mydriasis present.

Imamura, S., and Ichikawa, K. FAMILIAL ATROPHY OF THE OPTIC NERVE WITH TREMOR. [Rev. Neur., Vol. 26, No. 4.]

The parents were healthy and also four of the six children, but one brother and sister developed visual disturbances suddenly at puberty and they rapidly progressed. The symptoms closely resemble those described by Leber as characteristic of hereditary atrophy of the optic nerve. There are also certain other nervous symptoms, incoördination in the movements of the eyes and asymmetry in the innervation of the face in the young man. In the young woman there is tremor besides, including even the trunk when seated, and all the finer coördinated movements are slow and awkward but the gait and reflexes seem normal. There is pronounced mental impairment in this case. The patient had been apparently normal until puberty. The cases resemble some reported by Behr; his were all in boys, and evidently congenital. [J. A. M. A.]

Briggs, H. H. CONGENITAL PTOSIS AND MENDELISM. [Am. Jl. Ophth., June, 1919.]

A genealogy of six generations is here presented from a mountain family of North Carolina exhibiting a regular transmission of congenital ptosis. The six cases reported occur in the fourth, fifth and sixth generations. Twenty-three families are represented, in seventeen of which the father and in six the mother transmitted the malformation. In no case did the affected parents fail to transmit ptosis to one or more of their offsprings. Of the 128 members of the family sixty-four were affected and sixty-four were normal; of the total 128 persons seventy-four were males, fifty-three females (one unknown). Of the sixty-four affected thirty-three were males and thirty females; while of the sixty-four normal, forty-one were males and twenty-three females. The author's cases conform to the Mendelian law of dominance, because (a) the transmission is through affected persons only. (b) In every case the dominants (ptosis) had one parent affected and the other normal. (c) The relation of sixty-four dominants (ptosis) to sixty-four recessives (normals) conforms to rule. (d) That it is not a recessive character is shown by the fact that in no case was an affected child born from normal parents.

Rózsa, J. OCULOMOTOR PALSY WITH PERIODIC EXACERBATIONS. [Wien. klin. Wchnschr. 32, 1919, 340.]

A soldier, twenty years of age is here reported upon. He had been subject since the age of two to regular migraine attacks which led to permanent damage to the right eye. Between the attacks there was complete right internal ophthalmoplegia and a paresis of the right external ocular muscles, the movements of the right eye inwards (rectus internus), upwards and inwards (superior rectus), downwards and inwards (rectus inferior), upwards and outwards (obliquus inferior), being limited. During the attacks of migraine, which lasted 24-35 hours, the paresis increased until there was complete ptosis, the right eye being turned outwards and downwards. The paralysis outlasted the pain and gradually subsided, the attack completely subsiding in forty-eight hours. The Wassermann reaction was negative in both blood and fluid. No cells. The blood showed a lymphocytosis and increase of the eosinophil cells between and during the attacks. There was also exaggeration of the reflexes on the left, and greater electrical excitability of the facial nerve. This exaggeration of the reflexes on the left side were interpreted by the author as due to a slight disturbance of the pyramidal and supranuclear facial tract on the right side. The reaction to physostigmine negatived a nuclear localization.

Snell, A. C. INJURIES OF THE SUPERIOR OBLIQUE. [Arch. Ophth., March, 1919.]

A man of twenty-eight was injured above the right eyeball by the sharp spout of an oilcan. Ten days later his chief trouble was double vision on looking downward. There was limited movement of the right eye downwards and Maddox's rod revealed 4° of esophoria and 12° right hyperphoria. Exploration of the superior oblique muscle found the pulley's attachment was completely torn away. An attempt was made to fasten the tendon to the position of the rochlea, but it was unsuccessful. The diplopia continued and made the mechanical work impossible. Tenotomy of the inferior oblique of the same side was therefore performed after Posey's method. This proved entirely successful, a slight resulting diplopia above and to the left being of no inconvenience. Among the forty-two cases collected by the author, twenty-five patients recovered without operation.

3. SPINAL CORD.

Monrad-Kohn, G. H. SPINAL REFLEXES AFTER EXERTION. [Nors. Mag. f. Laeg., July, 1919.]

The findings of the knee-jerk in forty-nine men just before and after a ski racing tournament covering a hilly course of 50 km. are here reported upon. In all save two the knee-jerk was found greatly diminished. The race took nearly five hours. In ten the response was weaker on the right side than on the left.

Marinesco, G. AUTONOMY OF DIVIDED CORD. [Rev. Neur., Vol. 26, no. 4. J. A. M. A.]

Marinesco declares that the war experiences with completely severed spinal cords seem to have completely demolished Bastian's theory that reflex functioning is practically abolished after the cord has been severed in the lower part of the cervical or upper part of the dorsal region. This is true only of a brief primary period. Marinesco and others have demonstrated that the cord recuperates an actual autonomy. This does not seem to be the resumption of its former activity but a new activity of its own, which reproduces only rudimentarily the activity of the divided spinal cord in the dog. It is an inferior kind of activity which differs from normal activity and from that of decerebrated animals and of pathologic obstruction of the spinal cord-cortex route in man. There is no doubt that the fibers of the spinal cord can regenerate, but this anatomic regeneration is not systematized. It does not lead to reconstruction of nerve routes which would ensure the resumption of useful transmissions. Regeneration seems to be possible not only of the roots but of the white substance, but all the experiments and experiences to date demonstrate that the regeneration does not permit resumption of the old functioning. The activity of the spinal cord after complete separation from the cerebellum and brain is a new activity, pertaining exclusively to the spinal cord itself. The innervation of the extensors of the legs depends on the supramedullary centers, and these extensors do not regain their reflex activity. All the activity of the "spinal man" is in the sphere of the flexors. The flexors regain their tonus and function in a synergic manner, but their temperature is below normal, and electric tests show a different response from normal. The assumption seems plausible therefore that there is an autonomous activity of the spinal cord. It is manifested by defensive movements, but these defensive movements cannot be identified with the reflex defensive movements of the decapitated frog, as they are purposeless and could not serve in any way for actual defense reflexes.

Brown, Graham Stewart. A PHENOMENON OF "HETERESTHESIA." [Rev. of Neurol. and Psych., July-August, 1918.]

These authors describe a phenomenon which they designate by the new name heteresthesia. This denotes a difference in the degree of subjective sensibility to stimuli of equal degrees applied to different parts of the skin. When a stimulus of a constant strength (the scratch of a pin, the faradic current) is drawn across the skin, the subject states that an apparent change in sensation occurs at certain comparatively stable lines of demarcation. The phenomenon has been observed in two cases of compression of the cervical spinal cord, in one case of fracture of the skull with severe concussion and in six cases of concussion from shell burst. In the latter the condition was transitory and the

sign disappeared with the clearance of the signs of concussion. As may be seen from the charts which illustrate the paper, the lines agree remarkably with the supposed boundaries of the areas of peripheral distribution of the afferent posterior root fibers of the spinal cord. The observers think that the influence of suggestion in the production of these lines can be excluded; and in explanation of the curious fact that in their topography the well-known phenomenon of overlapping is absent, they offer the opinion that the lines of change are those of segmental and not of root areas and that the heteresthesia points to a condition of change of excitability between adjacent segments of the spinal cord. If it be conceded that the areas are segmental, the observations afford information upon a little-known subject, the dissociation of sensory function in segmental areas of the skin.

Noica, A. STRÜMPPELL SIGN. [Rev. Neur., July, 1919, no. 7.]

Noica here continues his studies on the reflexes with which he has occupied himself for ten years or more. He states that in the average Roumanini subject, especially in the young, movements in the other legs occur when one leg is flexed on the thigh, which resemble Strümpf's sign. In the healthy the movements are not produced unless effort has to be made to overcome resistance. This and other facts observed confirm the assumption that the Strümpf sign is a normal associated movement but modified by the loss of the motility of the paralyzed extensors, while the motility of the tibialis anticus has been retained. The infant makes associated movements before it makes isolated movements. A man recovering from motor aphasia may be able to pronounce a certain word when he is unable to pronounce the letters separately that form the word. A lesion in the pyramidal tract partially suppresses volitional control of movements and especially of isolated movements, carrying one back to an earlier stage in evolution in which only associated movements were possible. [Compare Brouwers study of the phylogenetic study of the reflexes as illustrated in multiple sclerosis and neuritis, in Winkler's Festschrift, 1918 J.]

Ayer, J. B. EXPERIMENTAL COMPRESSION OF SPINAL CORD. [Am. Arch. Neur. and Psych., Vol. 2, No. 2. J. A. M. A.]

The experimental work reported on by Ayer was done on cats. The results showed that paraffin may be injected into the epidural space in cats, with resultant compression of the cord and symptoms of incomplete transverse myelitis. Spinal fluid obtained from below the area of compression usually shows marked increase in protein content, at times is yellow and clots spontaneously. The greater the amount of protein the more likely is the fluid to clot. Fluids obtained from the subarachnoid space above the area of compression are invariably normal or nearly normal. The pathologic fluids obtained are entirely com-

parable with (1) the *syndrome de coagulation massive et de xanthocromie* of Froin, and (2) the syndrome of Nonne, both characteristic of spinal cord compression in man.

Lhermitte, J. DIRECT CONCUSSION OF THE DORSAL CORD. [Presse médicale, July 24, 1919.]

In a short communication this author reports the case of a man aged twenty-three who fell a distance of five meters and at once exhibited the clinical picture of complete functional section of the dorsal portion of the spinal cord. After four days in which the patient's condition remained unchanged, defence reflexes and Babinski's sign appeared. The man succumbed on the fifteenth day to broncho-pneumonia. On post-mortem the spinal column was found entirely uninjured and there was no meningeal lesion. The cord itself was microscopically normal, but microscopically the upper dorsal cord showed marked changes. The primary acute degenerative process described by Claude and the author was very manifest, and present in pure form. There was no area of softening, nor any hemorrhage. In no place did the vessels seem distended. This case shows that the new facts gleaned in military practise are likewise applicable in the traumatism encountered in times of peace and that direct spinal concussion (commotion) is a definite, separate clinical entity.

Collins, J. R. SPINAL TUBERCULOSIS. [Br. Med. Jl., Aug. 30, 1919.]

Rapidly fatal spinal tuberculosis met with during the war is here described. He states that he has been unable to find a record of similar cases in the literature to which he has access. In each patient the history was taken with care and there was no recollection of anything to point to old caries. Each appeared robust and gave a good previous health report, with the exception that the second gave a history of pains in his back. The illness of the first lasted six days, that of the second fifteen days, that of the third nine days. The onset in each case was swift and without warning. In the first case the patient found himself unable to walk to the medical hut. This man had had six months' service, the second had a year and five months, and the third two years and three months. All three cases showed in addition to the spinal tuberculosis evidence at autopsy of tuberculous involvement of the lungs.

4. MID-BRAIN AND CEREBELLUM.

Krabbe, Knud H. FALSE HEREDITY. [Ugeskrift for Læger, 1918.]

Two cases, father and son, showed a very marked tremor, coarse, slow, synchronic, rhythmic increased in intended movements. Both disseminated sclerosis and Parkinson's disease were to be excluded. It was first thought to be a hereditary tremor. Further examinations

showed that it was a mercurial tremor; the father had had a business in which he for thirty-five years had filled thermometers with mercury. The son had inherited the business and by this "false heredity" also got the tremor as he for twenty-seven years had boiled mercury in the thermometers. [Author's abstract.]

Gordon, A. A CASE OF CEREBELLAR ABSCESS (SPECIMENS PRESENTED).
[Philad'a Neurolog. Society, November 21, 1919.]

L. G., boy of fourteen, came under the writer's observation for an unsteady gait with a tendency of falling towards the right side.

Examination revealed a purulent discharge from the right ear of several month's standing. The mastoid process was somewhat tender to touch. A history of the otitis media following a protracted course of scarlet fever, preceded by diphtheria was given. The boy's temperature was then 97.5°. A blood examination revealed a fairly pronounced leucocytosis, viz., 17,800; Hemoglobin 60 per cent.; Red cells 3,420,000. The spinal fluid removed was bloody, and smears showed pus cells. The interesting diagnostic symptoms were as follows: Nystagmus was present. It was persistent, its quick movement was directed toward the left side. Standing on the right leg was difficult, but good on the left. There was no Romberg sign. In walking there was a tendency to go towards the right side and the head and trunk were also slightly inclined to the same side. When the patient, lying on his back, attempted to sit up, he raised his right leg first, while the left remained on the bed. On the other hand when seated on a chair he was told to raise his right leg, he first flexed the thigh on the pelvis and then only succeeded in elevating the leg. In other words, hemiasynergia was present. In the well known test for the finger-to-nose movement hypermetria was evident in the right hand. It was also observed in the right leg as in each attempt to advance in walking he raised his right foot off the floor higher than normally. Adiadokokinesia as well as Holmes' and Steward's tests for abnormal voluntary and passive movements were absent. The knee-jerk on the right side was diminished when compared with that of the left side. The toe-phenomenon was absent upon all the tests. A most interesting peculiarity was seen in the past pointing test. With eyes open and facing the writer the patient was told to hold his right index finger in contact with that of the writer. He was then told to close his eyes, lower his arm and again bring the finger in contact to the former position. It was then observed that the patient's finger would invariably deviate outward from the examiner's finger. A similar test with the left hand gave a normal result. The patient's eyes, in addition to the nystagmus, showed a mild degree of papillitis on both sides. The pupils were normal. The ocular muscles were not involved. There was no other cranial nerve involvement. Sensibility of the face was not altered. There was no evidence of paralysis on either side of the body.

The patient complained of frequent vertigo and of constant though mild headache. There was no vomiting during the time of the writer's observation, although the patient formerly had attacks of not infrequent vomiting. Insomnia was persistent. The patient complained of shortness of breath. Upon examination it was observed that there was a persistent bradycardia. The pulse was fifty. The mentality was not impaired. In making a diagnosis the following possibilities were considered: temporo-sphenoidal abscess, labyrinthitis and abscess of the cerebellum. The history of otitis media with persistent otorrhea led the aurist to the consideration of a mastoiditis. But the symptoms enumerated above suggested a deep seated abscess in the area of the cerebellum. First of all, in labyrinthine diseases in which the vestibular apparatus is involved and in which there are also some symptoms common to cerebellar diseases, there are nevertheless present some manifestations which are absent in the latter, namely: Romberg sign; vestibular ataxia which is properly speaking a statis ataxia in which individual movements of the limbs are not modified while they are greatly disturbed in cerebellar cases; finally nystagmus usually has a tendency to disappear and it is always directed toward the sound side, while in cerebellar diseases it is constant and persistent. (The Barany caloric test which is negative in labyrinthitis, could unfortunately not be carried out in this case.)

In cerebral abscess of the temporosphenoidal region nystagmus is exceedingly rare. Equilibrium may be disturbed but it is not of the unilateral character of a cerebellar condition. Asynergia is absent. There is usually some degree of aphasia or paraphasia. There is also deep-seated tenderness of the head on the side of the abscess. Mentality is always dull. In the present case, for the reason of the special character of the nystagmus, of the hemiasynergy, of the past-pointing of the dysmetria, strong presumptions were in favor of a cerebellar abscess on the right side despite the fact that the mastoid process was tender. Accordingly an operation was urged over the cerebellar area but the aurist insisted on a mastoid operation. A mastoidectomy was performed by him, but no pus was found and no necrotic bone was discovered. He then trephined the temporal region on the right side but again no pus was found over the temporo-sphenoid area of the brain. The incision was then closed. The patient's condition became more and more alarming and he died on the next day. At autopsy a large abscess was found in the right cerebellar hemisphere. The pus contained streptococci (in large chains) and staphylococci. The case is instructive from the standpoint of the diagnosis as one may be misled by the tenderness of the mastoid bone and consider only a mastoiditis. The necessity is indicated for a careful analysis of symptoms that may be observed in cases of otitis media thus leading to an accurate localization of the disorder either in the labyrinth, or in the temporo-sphenoidal

region, or else in the cerebellum. Exact surgical intervention is dependent upon the latter. [Author's abstract.]

Ellis, R. S. A QUANTITATIVE STUDY OF THE PURKINJE CELLS IN HUMAN CEREBELLA. [Journal of Comparative Neurology, Vol. 30, No., February 15, 1919.]

In this communication there is presented the results of a study whose main purpose was to show the numerical differences in Purkinje cells in normal, subnormal and senescent human cerebella. To obtain averages the cerebella of four human beings in the prime of life were obtained at autopsy in a general hospital. This gives a close approximation to the condition present in the average cerebellum as it appears in the hospital population, a group probably somewhat below the average for the community at large in the development of the nervous system. Nine cerebella from mental defectives were selected, while from subnormal infants six specimens were examined and the cerebella of five old people were studied as examples of senescent brains. During these studies the cerebellum from a man suffering from paresis was obtained and is included as an example of what may happen in this condition. In cases of extreme mental defect due to agenesis or to the early action of toxins during intra-uterine life, there is an evident deficiency in the number of cells. Similar reductions are found in senescence and paresis. In the subnormal cerebella the evidence indicates that the normal number of cells has never been present in a developed form. In the senescent and parietic cases, however, the small number is due to disintegration. The anterior lobe of the cerebellum shows the greatest deficiency in cells in both the subnormal and senescent cerebella, while the biventral lobe shows the greatest variation in both types of cases, in some greatest loss and in others the least loss. The differences between the two hemispheres average less in subnormal than in normal cerebella. This probably has a relation in the differences in the degree of unilateral dexterity found in normal and subnormal individuals, *i.e.*, the former are usually distinctly right or left handed as compared with the subnormal who tend to be more ambidexterous. The deficiency in cell numbers affords some explanation of motor defects found in subnormal individuals. It shows also that in idiocy and imbecility we may expect to find the whole brain defective rather than the frontal lobes only, while the higher grade of defectives (morons) probably show very slight deviation from the normal.

Eagleton, W. P. CEREBELLAR ABSCESS. [Journal A. M. A., Oct. 4, 1919.]

Eagleton discusses the surgical treatment of cerebellar abscess, and deduces the following conclusions. The distribution of intracerebellar and intrapial arachnoid abscesses in all parts and on all surfaces

of the cerebellum, although 62 per cent. originate from the petrous pyramid, require that uniformly to allow of systematic exploration of the cerebellum and to institute proper drainage, it is necessary in all cases: (1) To obliterate and doubly ligate the descending portion of the lateral sinus. The sinus, no matter how large, may be quickly obliterated and ligated by invulsing the external wall into its cavity. The reason for exploration from in front of the sinus is that here is the least danger of herniation, because of its being in the direction of minimum intracranial pressure from the cerebrospinal system circulation. The cerebrospinal fluid passing through the aqueduct of Sylvius and into the fourth ventricle with lateral communications to the basal cisterna, exerts direct pressure on the cerebellum, forcing it backward and upward. If now incision of the dura is over the lateral lobes of the cerebellum (behind the sinus), herniation of cerebral tissue immediately follows, while an incision in front of the sinus, being over the site of the minimum intracranial pressure, evacuates considerable cerebrospinal fluid but is less likely to be followed by herniation. (2) To expose the dura of the whole cerebellar fossa of the affected side; and, as the affected hemisphere occupies a position beyond the medium line, the bone over the unaffected hemisphere should be freely removed. (3) To perform a ventricular puncture in order to relieve the internal hydrocephalus. (4) Then to incise the dura as far forward as possible, the incision extending outward through the obliterated sinus and continued in whichever direction necessary. Because of the variety of situations of cerebellar abscess as found at postmortem, no other surgical manipulation promises to locate the abscess uniformly or allow of its complete evacuation, and the introduction of drainage material within the abscess itself.

Albo, W. L., and Hormaeche, D. G. CEREBELLOPONTINE ANGLE LESIONS. [Medicina Ibera, July 5, 1919. J. A. M. A.]

These authors remark that they could find only one article on this subject credited to a Spanish author among the 300 articles they consulted. They have encountered at the public hospital of Bilbao four cases of lesions pressing on the cerebellopontine tissues. The patients were three men between twenty-nine and thirty-two and one woman of twenty-four. The disturbances may be ascribed to trigeminal neuralgia at first, and it is important to examine with minute care the functions of the fifth, sixth, seventh and eighth nerves. In their cases the evacuation of the pus in the one case of cerebellopontine abscess was followed by a complete cure, but two other patients given operative treatment succumbed to respiratory paralysis. Treatment for syphilis had been pushed in some of the cases but no benefit was apparent. In one of the operative cases a cerebellopontine extension of a tumor in the left half of the cerebellum had been assumed, but the space was

found empty. Hemorrhage from the lateral sinus compelled tamponing and this entailed a destructive process with hemiplegia and the patient died six weeks later; no necropsy.

5. BRAIN. MENINGES.

Herrick, W. W., and Parkhurst, G. M. MENINGOCOCCUS ARTHRITIS. [American Journal Medical Sciences, 1919, CLVIII, No. 4, 473.]

After a brief review of the literature, report is made of twenty-eight cases of meningococcus arthritis occurring in an epidemic of 321 cases of meningococcic infection. In addition to these twenty-eight cases of meningococcic arthritis, there were twelve examples of serum arthritis. Three types of arthritis are described. The first, Type A, an acute polyarthritis involving wrists, knees, elbows, ankles, at times almost all the important joints. Its pathology is apparently hemorrhage into the synovia or periarticular tissues. The pain is severe and other inflammatory symptoms, except swelling, are marked. The duration is short and other metastatic complications of meningococcic infection, such as panophthalmitis, epididymitis, pneumonia are frequent. This early polyarthritis characterizes the severe infections and usually accompanies those cases with marked hemorrhagic rash, and makes the outlook somewhat grave. Of the twelve examples reported, four died—a mortality of $33\frac{1}{3}$ per cent.

The second type of arthritis, Type B, is quite different. It is monoarticular, usually involving the knee. The pathology is a purulent arthritis, the exudate containing demonstrable meningococci in many cases. The swelling is marked, but the other inflammatory symptoms are slight. The marked disproportion between the swelling and the other inflammatory signs is the striking feature of this type of arthritis. It occurs late in the course of the disease, is less often attended by other complications, is moderately prolonged and the prognosis favorable. The mortality in sixteen cases was 12.5 per cent. Aspiration of the exudate and local injection of serum are advisable when the exudate is large. The third type of arthritis, designated Type C, is the ordinary serum arthritis which does not require description. [Author's abstract.]

Stangl, F. H. MENINGITIS AND INFLUENZA. [Journal A. M. A., Oct. 4, 1919.]

The author notices in the reports of the pandemic of influenza references made to toxemia and to the symptoms of shock and meningitis, and quotes a number of authorities who have specially mentioned such conditions. He has, therefore, reviewed again the records utilized by Keeton and Cushman, with the addition of those which have accumulated since their report, 3,400 cases in all, and finds that nearly 1 per cent. of the total showed symptoms suggesting meningitis or cerebral involvement, ranging from slight neck rigidity and bilateral or lateral Kernig reactions to deep delirium and marked stiffness of neck, and in one

case to opisthotonus. Eight fatal cases, variously diagnosed as epidemic meningitis, uremia, tuberculous meningitis, apoplexy and polyarthritis, proved, on necropsy, to be influenza with marked lung involvement. The polyarthritis case is reported, the meningeal symptoms being most prominent. Another group of cases diagnosed as influenza-pneumonia or meningism, comprising twenty-one cases, including seven deaths, is tabulated. In all, rigidity of the neck was noted, the Kernig sign was positive in thirteen, and in six the Brudzinski sign was positive, and opisthotonos was present in one. The necropsy findings showed the usual influenzal lesions. The brain and its membranes presented only congestion and edema. The author summarizes as follows: "A severe toxemia and active delirium with definite meningeal manifestations such as is encountered in systematic infection and the acute exanthems occur in some patients suffering from influenza and influenzal pneumonia. The clinical picture in some instances closely simulates that of an actual meningitis or other intracranial causes of delirium and unconsciousness, and postmortem examination fails to reveal any inflammation of the brain or its membranes."

Caldwell, C. N. EPIDEMIC CEREBROSPINAL MENINGITIS. [Kentucky Med. Jl., Nov., 1919.]

Caldwell here reports upon 113 patients of whom he found seventy-two were of the type described by certain authors with which he was familiar as usual, nine chronic, ten abortive and twenty-two fulminating. Sixty-three had rigidity of the neck and twenty-nine had herpes; twenty-one had retention; an eruption was seen in sixty-one, and three were jaundiced; all had headache. These complications were observed: pneumonia, seventeen; eye complications, twelve; mastoiditis, one; nephritis, eight; metastatic abscesses, two; synovitis, two; pericarditis with effusion, one; empyema, one; deafness, two, and brain abscess, two. Total mortality 34 per cent., but ten of these patients had an intercurrent pneumonia of longer standing than the meningitis, one had an empyema and one had a brain abscess that was an extension from the ear.

Wegeforth, P., and Latham, J. R. LUMBAR PUNCTURE IN MENINGITIS. [A. M. Jl. Med. Sc., Aug., 1919.]

Infections of the meninges has been observed to occur following a lumbar puncture. Five such instances are cited by these authors in this paper. To prevent the possible accidental production of a meningitis following lumbar puncture it is recommended that careful consideration to the bacteriologic study of the blood be given before such punctures in acute diseases, in the absence of definite signs of irritation of the central nervous system, lumbar puncture should be avoided unless it is first conclusively shown that the blood stream is free of infection;

that when the clinical symptoms render a lumbar puncture advisable, minimal quantities of fluid should be withdrawn; that small bore needles should be utilized to prevent subsequent leakage of spinal fluid into the tissues.

Robinson, J. S., and Gerstley, Jesse R. MENINGITIS. [Journal A. M. A., Oct. 11, 1919.]

These authors report an epidemic in the Army of Occupation of forty-five cases of cerebrospinal meningitis which an American serum, five months old, and a still older French serum failed to control, but which was later mastered by a more freshly made French serum. From consideration of all the facts the authors deduce the following conclusions: "1. Bacteria may vary according to geographic location. Perhaps our first serum failed because, in its manufacture, strains and organisms indigenous to Germany and France were not included. This, at any rate, is a theoretical possibility. 2. A conclusion of vital clinical importance is that if a patient with epidemic meningitis does not respond at once to intraspinal treatment, one should not temporize. The agglutinating property of the serum against the patient's own organisms should be tested, and if the laboratory evidence is unfavorable, more satisfactory serum should be procured at once."

Orbaan, C. EPIDEMIC MENINGITIS. [Med. Tydsk. f. Geneesk., July 12, 1919.]

Reports upon eighteen cases in military service are here detailed. Five died; of the thirteen survivors there was no permanent paralysis of cranial nerves. One man was a meningococcus carrier in the spinal fluid although the nasopharyngeal secretions were negative. In another rapidly developing case the antiserum was used and prompt recovery took place. The men were separated into groups to examine for carriers. A group free, all the members of the group were set free. Separating into smaller groups made it possible to reduce those requiring isolation.

Frick, D. J. MENINGOCOCCIC MENINGITIS. [Calif. State Jl. Med., Oct., 1919. J. A. M. A.]

Twenty cases of meningitis are reported by Frick with a mortality of 15 per cent. Intensive intravenous and intraspinal treatment was used in all cases. The seventeen patients who recovered were well on discharge and able to do duty. All the cases were of moderate severity. Fifty-five per cent. of the men had a petechial eruption; 30 per cent. had a positive blood culture and 50 per cent. were unconscious on admission. Frick suggests that all patients with positive signs and symptoms of meningococcic meningitis should be given both intraspinal and intravenous injections of serum. Intraspinal injections of from 30 to

50 c.c. should be given every eight hours for six doses and then at less frequent intervals as needed. Intravenous injections of 100 c.c. after desensitization should be given every twelve hours for three or four doses and then every twenty-four or forty-eight hours as indicated by the condition of the patient and by the findings in the blood cultures.

Dorgan, J. CEREBROSPINAL FEVER. [Lancet, July 19, 1919. Med. Rec.]

J. Dorgan gives the results of an investigation of a large epidemic of cerebrospinal fever at an X Garrison in March, 1916, and of further investigations carried out at other stations in association with Camut, Scott, Armstrong, Napier, Tulloch, Davies, and Pringle. He states that at an early stage of the epidemic attention became directed to the close relationship between patients definitely diagnosed cerebrospinal fever and certain other patients suffering from indefinite febrile symptoms. The difference in the two forms of illness is in the degree and intensity rather than in the fundamental characters of the symptoms. It was decided to test obscure cases found in association with the genuine disease. Meningococci were found in the spinal fluids of many patients whose symptoms would not ordinarily have suggested meningitis. Suspicion was at first aroused as to the relationship between the above types of illness, not only by the similarity of the symptoms, but also by the manner in which they were found associated in billets, tents, barrack rooms, and regiments. The writer argues the existence of the unrecognized cases from both circumstantial evidence and statistical data. The latter show that in connection with each outbreak of cerebrospinal fever there is a coincident and proportionate outburst of cases of pyrexia of uncertain origin, the symptoms of which are compatible with those found in cerebrospinal fever. Many cases of cerebrospinal fever escape detection not only because they are not suspected clinically but also because they fail to be tested by lumbar puncture, or if they are tested by lumbar puncture, modern bacteriological methods frequently fail to demonstrate meningococci, particularly in early and irregular cases. It often happens that symptoms which are at first characteristic subside rapidly and before time has been found to perform lumbar puncture the whole clinical picture had altered and puncture is not performed. The failure in puncture must occur much more frequently in civil practice and in sporadic cases, where each patient is not under particular observation. The prime importance of the unrecognized cases is the part they play in the spread of infection. It would appear that indefinite cases, which often pass unrecognized, are in reality the more numerous, and that comparatively few progress to the stage where the symptoms are unmistakable. The writer also calls attention to the fact that the effects produced by a given dose of meningococci depends on the susceptibility of the patient rather than on the virulence of the organism, because the infection received from an acutely severe case

may result only in a mild and indefinite illness in the person next infected, and, on the other hand, a patient with a mild illness may reproduce a most virulent infection in another. There is no evidence at X Garrison to show that carriers convey active infection. The statistics as to carriers are conflicting and inconclusive. Their isolation is impracticable and unjustifiable. At X Garrison 520 carriers were isolated for varying periods up to four months. Of these it was found that at least 150 were not carriers at all. If carriers were capable of carrying infection it seemed extraordinary that each of these soldiers escaped infection when surrounded by four hundred virulent carriers. It is well known that carriers practically never develop the disease. This has been negatived at X Garrison, because one known carrier contracted the disease whilst employed as a nurse in the cerebrospinal fever wards. The figures at X Garrison show that a low carrier index may coincide with a high case incidence, and *vice versa*, and might be taken to indicate that cases produce carriers but not carriers cases. Carriers are found in all communities in larger or smaller numbers. In order to establish a case in favor of a carrier having caused the case, it is necessary to prove that the carrier, found as a contact, is actively pathogenic and different from the numerous other carriers universally present, or, that the proportion of carriers found among non-contacts is comparatively small compared with the number found among actual contacts of the patients. No one has attempted to show a difference between pathogenic and non-pathogenic carriers. Neither have any statistics been produced to show a difference in the percentage of carriers among contacts and non-contact carrier groups. The statistics in reference to the bacteriology lead the writer to conclude that neither the failure to find organisms on direct examination, nor a negative cultural result, can be relied upon to exclude a diagnosis of cerebrospinal fever. Recent work has thrown considerable doubt on the long established belief that meningococci pass directly through the nasal mucous membrane to the meninges.

6. BRAIN.

Greenfield, J. Godwin. THE PATHOLOGICAL EXAMINATION OF FORTY INTRACRANIAL NEOPLASMS. [Brain, Vol. XLII, Part I, 1919.]

The paper deals with the examination of a series of forty intracranial growths of which four were removed at operation, and the rest came to autopsy. They were diagnosed as follows: Tuberculomata two, granuloma one, sarcoma two, endothelioma, of which one was multiple, eight, myxo-endothelioma two, perivascular sarcoma three, sarcomatosis of meninges one; gliomata numbered eleven, and included one case of multiple gliomata, one glioma with a spongioblastic tumor in the opposite cerebral hemisphere, and one case of multiple gliomata of the nerve roots. Four cases were classed as neuroblastoma, of which one of the ganglio-neuroma type was extra-cerebral, apparently growing from the

pars nervosa of the pituitary gland. The other three were rounded non-infiltrating tumors of the cerebral hemispheres. There were six cases of acoustic nerve tumor, one of which presented bilateral tumors of the acoustic nerves, and multiple neurofibromata of the nerve roots as well as a psammomatous tumor on the occipital cortex.

In this series, therefore, there are twenty-one cases of forms of tumor peculiar to the nervous system, and sixteen mesoblastic neoplasms, tuberculoma and granuloma making up the remaining cases.

An attempt was made to classify these tumors according to the tissue from which they were derived and their manner of growth. Important diagnostic evidence is derived from the study of the margin of the tumor, and in most cases there is little difficulty in distinguishing sarcomata from gliomata by this means alone. For whereas gliomata present no definite margin and areas of gliomatous tissue are often found microscopically in apparently healthy brain tissue at some distance from the area of obvious tumor growth, in sarcomata the infiltration is less diffuse and an irregular edge of tumor growth can usually be made out. Perivascular sarcomata may also be distinguished from endotheliomata in this way, for whereas the endotheliomata peel out from the brain tissue leaving it intact and covered by a fine membrane derived from the lepto-meninges, the perivascular sarcomata carry with them a thin layer of softened brain substance. These two types of growth are otherwise of very similar macroscopic appearance and rate of growth. The similarity of perivascular sarcomata to certain types of gliomata, especially as regards the way in which the new blood vessels are formed is noted, and it is suggested that these tumors are possibly derived from undifferentiated nerve cells rather than from mesoblastic elements.

An anomalous case of infiltration of the subarachnoid space with tumor-like cells is recorded. The patient died of hydrocephalus and macroscopically no very obvious cause for this was discovered. Histological examination, however, showed that the meshes of the arachnoid were everywhere filled with small epithelioid cells. It is suggested as a possible explanation that this is a form of diffuse neoplasm of the endothelial cells lining the arachnoid.

The four cases classed as neuroblastoma are fully described. These are all rounded, fairly well-defined tumors, showing little tendency to infiltrate the neighboring brain matter. In two of them the diagnosis was undoubted as Bielschowsky's staining method demonstrated numerous dark fibrils which appeared to proceed from large multi-polar cells. In the other two the diagnosis was not so definite, but both showed an arrangement of large pyriform cells lying around the blood vessels and sending thick processes both into their walls and into the surrounding tissue. Similar cells were not seen elsewhere than in relation to the blood vessels—the greater part of the tumor tissue being composed of small cells of the glial type. These two cases are included under the neuroblastomata as they appear to be tumors derived from rudimentary

cells of the glia or nerve cell type, and to possess considerable similarity in arrangement and manner of growth to the neuroblastomata while they differ in many ways from the ordinary gliomata.

The last part of the paper is devoted to the histogenesis of acoustic nerve tumors. The writer considers that they are in all respects identical with neurofibromata as found either on nerve roots or peripheral nerves, and agrees with Durante and Verocay in regarding their origin to be the cells of the neurilemma sheath. In the acoustic nerve tumors there are areas which present a gliomatous appearance and it seems possible that, as Cushing believes, these tumors arise at the transition zone between glia and neurilemma, and take origin from both structures. [Author's abstract.]

Sonnenburg, W. M. CRANIOPAGY. [Journal A. M. A., Nov. 1, 1919.]

The author describes a craniopagus which was delivered at the Madison General Hospital, May 5, 1919. The twins together weighed eleven pounds, one ounce at birth; their faces and bodies were in perfect alinement. One was a perfectly developed female, but the other had an imperforate anus and an imperforate "penis" as large as the usual infantile organ. In the first mentioned the internal genitals were apparently normal; the other had normal ovaries but the uterus was four times the normal size, and the sigmoid colon, greatly distended, emptied into a cloaca. The left umbilical artery was also very small or absent. The cords came off the same placenta at the center, about 2 cm. apart. The birth occurred at 9:50 P.M. and the more normal infant began breathing thirty seconds after birth and the other fifteen seconds later, and within five minutes both cried vigorously. There was evidently no close functional correlation in nervous activity. One would sleep soundly while the other was awake or cried. The more abnormal infant soon showed signs of trouble from the imperforate anus, its abdomen becoming greatly distended, and on the ninth day the "penis" also became distended. A probe was pushed in at the base of the "penis" and fecal matter was discharged. It became unconscious on the ninth day, and the other child showed discomfort and cried until its death, May 15, fifteen minutes after the more abnormal infant died. When the skull was opened it was found that the brains were enclosed within a common dura mater, but each brain was covered separately with pia which was fused where they came together. There seemed to be no direct connection in the circulation, though there was a communication between the sinuses. The case is a rare one of human monstrosity. Sonnenburg gives a brief review of similar cases in the literature. "From this brief review of the literature, it is evident," he says, "that the rare form of double monster known as parietal craniopagus usually is of the female sex. The head of one individual as often faces laterally or backward or in the same direction as that of the other. There is usually considerable independent individuality in the reactions

of the twins. The brains are nearly always, if not always, separated by pia mater, and sometimes also by dura mater. The chief vascular connection appears to be in the venous sinuses of the skull, but at times other vessels anastomose. It is probable that there must have been some arterial anastomosis in the case of the parasitic head of Home. . . ." The article is illustrated.

Bergmark, G. CORTICAL EXCITABILITY IN INFANTS. [Upsal. Läk. Förb., July 24, 1919, No. 5. J. A. M. A.]

Bergmark describes the results of electric and other tests on an infant, five weeks old, with a large hernia of the brain. Delivery had been normal but the small hernia of the brain noted at birth rapidly increased until, as the illustration shows, the circumference of the hernia was larger than that of the head, the neck of the hernia measuring 4 to 6 cm. in diameter. There was no reaction to gentle palpation of the herniated brain tissue but the child screamed with strong pressure on it. Bergmark, assisted by Bárány, applied various tests to the brain tissue which demonstrated localized responses to mechanical and thermal stimuli. The modifications under general anesthesia were interesting, as also the peculiar form of the motor response in the arm to pressure on the arm point in the neck of the hernia.

Giannuli, F. VERBAL AMNESIA AND HOMOLATERAL PARALYSIS FROM HEMORRHAGE IN THE TEMPORAL LOBE. [Riv. di patol. nerv., 23, 1918, 73.]

Woman aged fifty-nine years is here studied. He finds that (1) complete verbal amnesia is a syndrome of lesions specially situated in the left temporal lobe. (2) Homolateral paralysis may form a part of the extension syndrome of lesions of the temporal lobe. (3) This paralysis illustrates the anatomical connections existing between the temporal lobe of one hemisphere and the Rolandic area in the other, which are presumably established by tracts which cross in the corpus callosum and which pass through the external capsule.

Pieron, H. CORTICAL SENSORY AREAS. [Rev. de Méd., Vol. 36, No. 2.]

The details of twenty-one cases of skull wounds with cortical anesthesia are here recorded. He shows that definite skin sensory areas have separate special representation in the cortex. Pain, temperature and deep pressure are modified last. The sensory rôle of the cortex is taken up in detail, the separation of sensory and motor centers, the sensory representation in the cortex of different segments of the surface of the body, and the proportional representation of the different forms of sensation and perception are also discussed in the light of Head's recent findings.

Bing, R., and Schwarz, L. STEREOGNOSIS. [Schweiz Arch. f. Neur. u. Psych., Vol. 4, No. 2.]

In this elaborate study the authors show that there is a cortical lesion when the subject is unable to recognize objects by touch, the sensory and perceptive powers being unmodified. When the cortical lesion is diffuse there is loss of secondary tactile identification, but usually it is a symptom of a focal lesion. This focal lesion is usually at the middle third of the parietal ascending convolution and the parietal lobe on the opposite side from the astereognosis. In one patient the astereognosis of the left hand was so pronounced that, with the eyes closed, the man was unable to tell a coin from a pencil, a watch from a box of matches. Other symptoms also suggested a tumor in the brain; they had come on suddenly and by the tenth day left hemiparesis developed. Consent to proposed operations was deferred and the patient died seventeen days after the onset. On necropsy an abscess was found at the point specified above while the parietal lobe and the supramarginal gyri were intact. The findings confirm Head's statements regarding cortical localization.

Friedman, E. D. CORNEAL ANESTHESIA IN HEMIPLEGIA. [June 21, 1919. J. A. M. A.]

In coma of moderate degree E. D. Friedman has found that unilateral corneal anesthesia evidenced by absence of the corneal reflex (winking), is a valuable diagnostic point differentiating hemiplegia from other forms of coma. The lesion must be sensory, for if it were motor, as stated by Milian, the consensual reflex would still be present on the other side. The corneal anesthesia may be due to the presence of sensory fibers in the motor pathways. Diagnosis between hemiplegia and uræmia is important, as it affects the treatment. The reflex is best elicited by carefully passing a small blunt object along the conjunctiva to the corneal margin.

Jefferson, G. GUNSHOT WOUNDS OF SCALP: NEUROLOGIC SIGNS PRESENTED. [Brain, 42, 1919, Pt. 2. J. A. M. A.]

The observations recorded by Jefferson are based on a series of fifty-hour unselected average cases of scalp wounds as seen at the base in France. A large number of the patients showed generalized signs; a history of unconsciousness, complete or partial, with vomiting, nausea, headache, and exaggeration of the tendon jerks generally. Only five patients out of the whole series showed no positive neurologic signs at all. In ten more the only symptom complained of was headache, but this was often so severe and the patients were mentally so dull for a short time that it was evident that the brain had received a severe shaking up. One fourth of the patients allege that they were actually unconscious for brief periods, while another fourth were stunned, frequently being knocked down by the impact of the missile. Headache

was present in forty-five cases, definitely absent in six, and not noted in three. Giddiness, was the next most common sign, only being noted on gross changes of posture, and therefore later in convalescence when such active movements began to be attempted. It was never a serious factor. Vomiting occurred in eight cases and nausea was, or had been, present in thirteen. Tendon jerks were exaggerated in twenty cases, and of these eight presented increase of both arm and leg jerks. Increase of the arm jerk always portended a graver injury, and cerebral injury was always suspected when they were active. True ankle and patellar clonus, continuous and regular, was never found, but a few beats, from two or three to six, occurred in seven cases. But when present on one side only, even this mild form has a value. In none of these series was there any injury to the skull, yet there were eleven definite local contusions of the motor cortex, four of the visual, and two more in which a motor lesion was associated with a sensory disturbance of the hand. Three presented Jacksonian seizures, and three were trephined on the neurologic evidence; in two an extradural clot was found, in one, nothing abnormal was noted. There were signs of contralateral injury by contrecoup in four cases.

Krabbe, Knud H. A NEW FAMILIAL INFANTILE FORM OF DIFFUSE BRAIN SCLEROSIS. [Brain, Vol. 39, 1916.]

The author describes the histories of five cases and anatomo-pathologically the three cases of a disease which seems heretofore to have been very little described. It shows the following characteristics: it is usually a hereditary disease; it sets in somewhat acutely at about the fifth month in a child who up to then has been quite healthy; it progresses by a chronic course ending with death, five to six months after the onset; universal rigidity of the musculature, violent tonic spasms, probably causing pain, and brought on by touching or noise form characteristic symptoms. As a rule, nystagmus is present, and in the latter stages atrophy of the optic nerve. Periodic elevations of temperature occur without perceptible cause, outside the central nervous system. Finally, extensive paresis and pronounced debility close the scene. The intellect seems scarcely to be developed and the little that is developed seems rapidly to perish. The anatomo-pathological findings are: a marked hardness of the white substance of the brain without alteration of its shape. Microscopical examination of three cases showed relative intactness of cortex and the basal ganglia, the nervous centers of the brain and of the spinal cord; destruction of the medullary sheaths and axis cylinders throughout the white substance of the cerebrum (a 2 mm. layer, however, is preserved immediately under the cortex). Complete destruction of the white matter of the cerebellum and degeneration of the spinal nerve tracts are present. The destroyed tissue is replaced by dense fibrillar glia, in which are seen a considerable number of variously shaped glia-cells, mostly protoplasmic; the

vessel sheaths are infiltrated with fatty granule-cells and other apparently gliogenous scavenger cells. There is a total want of new formation of vessels or infiltration of the vessel sheaths with plasma-cells, lymphocytes or leucocytes.

Cases as the above described have before been classified as diffuse brain-sclerosis. The diffuse brain-sclerosis however is a collective name for at least three different diseases: (1) brain-syphilis which produces extended destruction of the brain-substance and substitution with neuroglia so that the brain is changed to a hard gliotic substance; (2) Schilder's encephalitis periaxialis diffusa, which perhaps are cases of disseminated sclerosis with plaques of enormous extension; (3) the above described cases and an older case of Bencke. These cases must be regarded as a purely degenerative and not as an inflammatory process. They belong to the large group of the hereditary nerve-diseases (Friedreich's disease, Huntington's chorea, the muscle-dystrophies, etc.). Between these diseases the here described forms of brain-sclerosis present a certain relationship to Pelizaeus-Merzbacher's disease, aplasia axialis extracorticalis congenita, on one side, and to Tay-Sach's form of familial amaurotic idioey on the other side. In other respects it differs conspicuously from both the groups. [Author's abstract.]

7. NEUROSYPHILIS.

Smit, J. H. R. NEGATIVE WASSERMANN IN NEUROSYPHILIS. [Ned. Tijds. f. Genees., June 28, 1919. J. A. M. A.]

Smit declares that one must not pay much heed to negative Wassermann reactions in syphilis affecting the nervous system and the eyes. The response with blood was constantly negative in twelve of the fourteen cases he has encountered in the last three years. In half of them the blood vessels and in the other half the cornea or the heart seemed to be primarily affected. In only two of the twelve was there a history of known syphilis. In two of the cases in which the syphilis had run an insidious course, it flared up with stormy symptoms during an inter-current infectious disease, as also in two others who were not given the Wassermann test. One of these developed apoplexy after typhoid, with oculomotor paralysis, tabes, diabetes insipidus, prostatitis and weakness of the heart; another after pleurisy had diabetes insipidus and multiple adhesions in the pleura, with shriveling of the lung. Tabes in one case seemed to retrogress under twelve intramuscular injections of mercury peptonate, from 0.01 to 0.03 c.c. in 3 c.c. of water. Notwithstanding the negative response to the Wassermann test, the radical improvement under mercury confirmed the diagnosis of syphilis.

Fordyce, J. A. INTRASPINAL THERAPY IN NEUROSYPHILIS. [Am. Jl. Syphilis, July, 1919.]

The age of the infection is of great importance for good results in the treatment of syphilis. Emphasis is therefore laid upon the importance of early diagnosis, and radical treatment. In the late secondary stage a serologic cure is difficult to obtain, and therapeutic agents have to be used very expertly. The invasion of the central nervous system complicates the problem on account of the degenerations of tissues, and the inaccessibility of the spirochetes in certain types of neurosyphilis. The technic and persistence of the physician are all important for the success or failure of intraspinal therapy, in that much depends on the cytobiologic indications in the spinal fluid for starting or continuing a certain mode of therapy. Fordyce then gives the order in which the reactions disappear. Usually the cytology is first influenced. It sometimes takes one or two years to effect any impression on the globulin content or Wassermann reaction. Modification in intensity of the globulin reaction is usually associated with weakening in the Wassermann reaction strength and with a change in the colloidal gold reaction. The only appearance of rapid changes in a strongly positive Wassermann reaction is found, so Fordyce thinks, in cases of early syphilitic meningitis. Gradual diminution in the Wassermann intensity in old cases of neurosyphilis is of good prognostic import. Once negative, Fordyce has reexamined patients after from one to three years who have given no indication of a return to previous phases.

LaFora, G. R. INTRASPINAL TREATMENT OF SYPHILITIC DISEASES OF THE CENTRAL NERVOUS SYSTEM. [Revue Neurologique, August, 1919.]

LaFora, formerly pathologist at St. Elizabeth's Hospital now in Cajal's Clinic, records fifteen cases of general paralysis with manifestations under his treatment of retrogression both in symptoms and in laboratory findings in lumbar puncture fluid. This is not found in general paralysis spontaneous remissions. The disease must be diagnosed in its earliest phases, he says, within the first six or eight months. The laboratory findings in cerebrospinal fluid and blood render this possible. The Wassermann test used with only 0.2 c.c. of cerebrospinal fluid, and the special curve of the colloidal gold test, are two laboratory reactions characteristic of general paralysis alone. Thus it can be detected before any clinical symptoms appear, and may be arrested for years and even permanently by intraspinal treatment. The treatment should be continued for a year and a half, or until the five laboratory reactions have become permanently negative.

In eight cases of tabes this treatment was almost always effective. Progressive amaurosis was thus arrested also, and proved better than the intravenous method in arresting the pains of syphilitic radiculitis.

Intravenous treatments were given in the intervals and susceptibility was tested intraspinally and by the vein by gradual therapeutic preparation. LaFora also describes four cases of syphilitic spinal and two of cerebral paraplegia. The autoserum prepared in vitro by the Byrnes and Ogilvie methods was used, venous injections at intervals of from four to six days were made with 0.01 gm. of mercury and arsphenamin. For the first intraspinal injection, arsphenaminized serum, never more than 2 or 3 mg., was used. The maximum was 4 mg. of mercuric chlorid or 7 mg. of [French] neo-arsphenamin. Intraspinal injection intervals were from twenty to forty days, venous injection about twice a week with alternation of mercury and neo-arsphenamin and a break of two or three weeks after six months. This treatment proved especially successful in syphilitic processes that have not yet invaded the deep parenchyma, and where meningeal lesions have only just put in an appearance around the nerve lesions.

Foti, P. SYPHILIS AND CHOREA. [Pediatrics, Vol. 27, No. 9.]

In thirteen pediatric of seventeen cases of chorea at the clinic at Naples during the last five years there was positive signs of syphilis. Three others were also probably syphilitic and only one of the entire group seemed to be free from the disease. This 95 per cent. of incidence must be more than the coincidence which Comby claims. He regards it as a fundamental background.

Fildes, Parnell and Maitland. UNSUSPECTED NERVOUS DISEASE IN SYPHILIS. [Brain, Parts III and IV, 1918.]

These authors here discuss the problems of syphilis in the early stages of the neurosyphilitic syndrome. "With increasing investigation of early cases of syphilis by neurologists, they say, it began to be suspected that affections of the nervous system were not uncommon in such patients, although they did not necessarily lead to pronounced symptoms. Evidence then began to accumulate that such affections as were clinically detectable, were in reality only a fraction of those which really existed; that the nervous system was frequently attacked without any outward indication of this being manifest." The writers have confirmed the foregoing by the systematic examination of 624 syphilitic men at Haslar Hospital, of whom the majority were in the early stages of infection and showed no obvious signs of nervous disease. Of these, 18 per cent. showed undoubted evidence of an abnormal condition of the nervous system. The signs were, first and most important, a pleocytosis—ten or more cells per cubic millimeter—of the cerebrospinal fluid, proving the existence of a syphilitic meningitis; and secondly, in a certain proportion of cases, either lesions of the eye-grounds, indicating a beginning retinitis, or disordered function of the internal ears. There was a progressive increase of incidence of these signs up to the sec-

ondary stage of infection, but a slight decline in the later secondary, followed by a decided increase in the later so-called latent stage. It is remarkable that few of the men complained of any disability, even when the meningitis was so acute as to produce a visible opalescence in the cerebrospinal fluid. Anti-syphilitic treatment usually, but not invariably, ameliorated the condition. The importance of lumbar puncture as a routine in the examination of all cases of syphilis is emphasized.

Madenna, C. SYPHILITIC OCULO-MOTOR PARALYSIS AND CHRONIC NEPHRITIS. [La Medicina Practica, September 30, 1919.]

The author reports a case of complete right oculo-motor paralysis and chronic nephritis in a man aged forty-six due to unrecognized syphilis. The patient was cured within forty days by five intravenous injections of neo-arsenobenzol, the doses of which were gradually increased from 0.30 to 0.75 gram. No history of specific contagion could be obtained, but the diagnosis of syphilis was established by the general glandular enlargement, periostitis of the sternum and tibiae, a positive Wassermann reaction, and the result of treatment.

Christian, T. B. SYPHILIS AMONG THE INSANE WITH SPECIAL REFERENCE TO THE HECHT-WEINBERG-GRADWOHL TEST. [American Journal of Syphilis, October, 1919, Vol. III, No. 4.]

The Hecht-Weinberg-Gradwohl Test has been in the author's hands a better control of the Wassermann reaction than any of the other controls in use. Among the 1,213 cases tested there were 250 cases showing a positive Hecht-Weinberg-Gradwohl test; a percentage of 20.61; and the Wassermann reaction showing 208 positive reactions with a percentage of 17.14. The percentage of positives among the male patients was 22.08 with the Hecht-Weinberg-Gradwohl test and 18.79 with the Wassermann reaction; among the female patients 18.38 per cent. with the Hecht-Weinberg-Gradwohl test and 14.66 per cent. with the Wassermann reaction.

Among the cases the author examined six cases were found with a four-plus Wassermann test and negative Hecht-Weinberg-Gradwohl test, and two cases with two-plus Wassermann tests and negative Hecht-Weinberg-Gradwohl tests. Three of the number showed the same on repetition of the test, and the cases had all clinical symptoms of syphilis. In seven cases the author found negative Wassermann reactions and four-plus Hecht-Weinberg-Gradwohl reactions, while previous Wassermans showed negative reactions and the cases had no clinical history of the manifestations of syphilis.

In regard to the effect of treatment upon the Wassermann and Hecht-Weinberg-Gradwohl test, the author found a marked reduction in the Wassermann test but very little in the Hecht-Weinberg-Gradwohl test. In paresis and taboparesis a strong reaction is almost constant in

the blood and spinal fluid. Among twelve cases of paresis the Wassermann reaction varied from one plus to three plus but the Hecht-Weinberg-Gradwohl test and the Wassermann of the spinal fluid remained four plus.

All cases that showed a doubtful Wassermann reaction were cleared up by repetition of the test and using the Hecht-Weinberg-Gradwohl test.

Among the series of cases there were 93.3 per cent. of sera which were found to contain sufficient complement and natural antihemolysin for the conduct of the Hecht-Weinberg-Gradwohl test. There were eleven cases which were diagnosed clinically as syphilis and gave a Wassermann reaction and Hecht-Weinberg-Gradwohl test both negative. Eight cases gave positive Wassermann tests with negative Hecht-Weinberg-Gradwohl tests and seven cases gave negative Wassermann tests with four-plus Hecht-Weinberg-Gradwohl tests from which syphilis could be excluded.

Among the paretics of this series the Hecht-Weinberg-Gradwohl test was positive in 98.5 per cent. of the cases and the Wassermann was positive in 97.01 per cent. of the cases. [Author's abstract.]

Book Reviews

Jung, C. G. STUDIES IN WORD-ASSOCIATION. Experiments in the Diagnosis of Psychopathological Conditions to be Carried Out at the Psychiatric Clinic of the University of Zurich. Translated by Dr. E. D. Eder. London, William Heinemann.

The practical importance as well as the theoretical value of this large volume deserves that the translation of its contents into English shall be especially noted although the book has been reviewed already in these pages in its original form. Since it is a volume that should be at hand for definite guidance in the use of such word association and for occasional study and refreshment in the labors of everyday practice of psychoanalysis, its able translation is a distinct service to medicine. It does not in fact limit itself only to psychoanalytic therapy but its presentation of the use of word association with various grades and types of mental condition, as well as its restatement and exposition of fundamental psychological principles give it a wide value beyond this more immediate application.

Doctor Jung does not claim its authorship but only the direction of the experiments and publication of the results and of the theoretical discussion. To both however he contributes his valuable share. Other well-known names from among his fellow workers head more than half of the chapters, since to each of these has fallen some special division of the experimental work. They are well fitted also from their theoretical and practical training to set forth some of the cardinal facts of the psychoanalytic theory. A very valuable element in these discussions is the connection that is made with the more academic psychology due to the good grounding on the part of the writers in its more vital and workable principles. This reveals its historic and contributive background to the more modern affective psychology and it also recalls to those whose interest lies chiefly in the older psychology that this may advance into a more humanly serviceable territory.

Experiments are recorded first in regard to the word association tests upon normal persons. This gives a basis for the mechanical and technical details of the work as well as a measure of comparison by which deviations in pathological subjects can be estimated in part. Other chapters deal then with the tests as made upon imbeciles and idiots, upon an epileptic, and in hysteria. One chapter is devoted to familial agreement in association type, while the test has also been made

of the psychophysiological changes which accompany the experiments and also of the galvanic changes which are associated with the psychical phenomena. These chapters afford a full and instructive guide in technic and an interesting interpretative summary of the results obtained in their relation to the discovery of complexes and the relation of these to the individual psychic situation.

It is never claimed that these are fully revealed as if this were some process of wizardry. Much more definite and detailed is the explanation and the insistence that the use of word association furnishes, rather, important complex *indicators* from which a starting point for further analysis may be made. These afford unmistakable guides where otherwise revelation from the unconscious might be seriously blocked. Various examples are given of the analysis which then proceeds from such a starting point and of its reference back to these complex indicators discovered at the start.

Among the theoretical discussions special mention might be made of Bleuler's excellent chapter on "Consciousness and Association," in which he presents very clearly and logically the need of a psychological recognition of the unconscious as well as of consciousness. He does this by showing how incomplete is the psychology which accepts merely the latter to account for the phenomena of everyday experience, the simple "automatic" activities which fill a large part of daily life and the appearance in consciousness of matter which must have been perceived and brought into a constellated unity before consciousness of it has occurred. These are of such continued effect upon consciousness that activity can never be explained or understood without them. This is true in the ordinary life of healthy persons and of greatest importance in understanding and reaching the source of symptoms in a psychopathological condition of any sort. The meaning of the association work and the existence of these associations as connected with this unconscious content, to which they give access, are discussed in this comprehensive review of the unconscious. Thus the theory and the practical application of it are given especially valuable setting.

Winkler, Cornelis. MANUEL DE NEUROLOGIE. Tome I. L'Anatomie du Système Nerveux. Première Partie. De Erven F. Bohn, Harlem.

Winkler has been professor of neurology and psychiatry now for over twenty-five years. He has occupied a unique and commanding position. His scientific productivity has been remarkable; his versatility unique, in that he has contributed widely in all of the many fields of neurology and psychiatry, morphological, physiological, and pathological, and withal he has displayed an open-minded sympathy to the march of events in the various fields of medicine rarely met with.

The present volume, with its related volumes, gives evidence of all this. It is the sixth volume of a series of the Opera Omnia of Winkler which have been collected and uniformly printed as a token of appreciation by his colleagues of Holland. We purpose reviewing the other volumes at some other period and would now devote our attention to this, the first of a projected series which shall constitute a "Manual of Neurology."

This work, which was originally written in Dutch, has been most ably and pleasantly translated into French by Prof. Victor Willem of Ghent, thus wisely affording a much wider circle of readers for this admirable treatise. It is a large octavo of approximately 400 pages and is the first part of a functional anatomy of the nervous system, comprising thus far only a discussion of the nervous apparatus of smell, of sight, of general sensibility, and of taste. On the title page the author very conservatively calls it a "*tentative grouping into functional systems, of the pathways and synapses, of various localizations, by which the diverse sensory impressions are translated into reflex actions.*"

Thus almost for the first time we have at least the beginnings of a real functional anatomy of the nervous system. It is true that Van Gehuchten, Von Monakow and the Dejerines have published works of somewhat similar viewpoint. As Winkler points out, and in the writer's opinion justly so, Van Gehuchten's work is really more of a pure morphology; Von Monakow's Gehirn-pathologie has a different trend. In this notable work anatomy is used more as a directing guide to solve many pathological problems, and moreover only the cerebral systems are dealt with. The treatise of the Dejerine's more closely approaches the ideal here projected but again here there are many deviations of point of view which are of interest, especially for the student of neurophysioanatomy.

The author's ideal is to have this serve as a manual for neuropsychiatry. It is to be a description of the nervous system conforming to the idea expressed in the title page—"an apparatus in which sensory impressions are transformed into reflex movements of higher and higher orders from simple vegetative activities to those of the most complex social symbolization."

After a short introduction on the general structure of the prosencephalon, in which Winkler speaks of the chief commissural systems known, and the better understood projection systems, he then takes up the olfactory systems in his first chapter. The ancient importance of this system in aiding the animal to find food is pointed out. He then discusses the receptor apparatus, the connectors and then the complex anatomy of the rhinencephalon. This is done from the comparative morphological and physiological points of view in clear descriptive language and amply illustrated by excellent engravings. Thus the entire range of olfactory stimuli can be traced, as they become integrated

with other parts of the cerebral switchboard and the mechanisms which instigate and direct behavioristic responses to olfactory stimuli laid bare.

Chapter II takes up the light mechanisms of the eye in much the same manner.

Chapter III which makes up the greater part of the volume deals with the sensori-motor systems, or the systems of general sensibility. As skin receptors Winkler accepts (1) the corpuscles of Grandry, (2) the terminations of Herbst, (3) Vater-Pacinian bodies, (4) Krause's simple and complex terminations, (6) Meissner's corpuscles. As muscle receptors he cites (a) Kühner's body, (b) Golgi's neurotendinous bodies serving as receptors for muscular tensions. He also is inclined to accept the hypothesis of the compound nature of striped muscular tissue—the sarcoplasm being related to the vegetative nerve net system, whereas the anisotropic disc structure is a part of the sensorimotor system in the sense of this present chapter. Sherrington's enteroceptive and interoceptive groupings are tentatively accepted.

Here Winkler shows how the sensory systems, by reason of the marked metameric integrations of the different segments of the body, becomes a highly complicated affair, standing in comparatively strong contrast with the relatively simple and probably phylogenetically much later olfactory and optical systems—which latter even show many million years of complex evolutionary integration.

Some of these difficulties are clearly shown, for instance, in Winkler's very lucid discussion of how much and how little is known of the segmental localization of the muscles in the anterior horn cell groups.

Chapters IV and V take up the spinal cord continuations at the level of the medulla and the lower cranial nerve integrations. Winkler accepts Bennett Bean's generalization of a new cranial nerve, the *glossopalatine*, which is a part of the gustatory apparatus, parts of which have been confused with the facial, as sensory components of the same, and parts with other cranial nerves. At this level the gustatory apparatus is brought into the machine making up Chapter VI, which also contains a discussion of the central gray of the medulla—seen in the light of a centripetal autonomic (vegetative) mechanism, as a continuation of and analogous to the central gray of the spinal cord. Winkler thus keeps the vegetative nervous system integrations in touch with the rest of the neural machinery in a manner which greatly contributes to a better understanding of the functioning of the nervous system as a whole.

This book is so full of stimulating clarifications even in its modest tentative phraseology, that one is moved to a certain impatience for its continuance. One competent neuroanatomist and neuropsychiatrist, at least, has had the *clan* to attempt to handle the nervous system as a unit in its functional capacity to capture, transform, and release energy.

We believe it to be the very best contribution to the general subject that has appeared in recent years and can most fervidly hope that the author may be able to complete a work so ably planned and thoroughly carried out.

JELLIFFE.

Evans, Elida. *THE PROBLEM OF THE NERVOUS CHILD.* Introduction by C. G. Jung, M.D., LL.D. New York, Dodd, Mead and Company, 1920.

A contribution of much value is made by this book to the practical problems of nervous and mental disease. The problem of the nervous child has remained an unfruitful one so long as it was kept in the obscure realm of rigid and technical classifications where it was regarded as only a separate and distinct type of manifestation peculiarly set off among special disease types or in specially constituted children. Psychoanalysis with its broader basis of empirical investigation, its consideration of nervous problems in their relation always to the larger whole of character development and personal adjustment to the world has brought the problems of children out of such sterile backgrounds. Here is presented a survey of the questions concerning the children's development of nervous troubles, of the mechanisms by which they have been produced and the methods by which they can be reached in their source and the child's libido be redirected into healthful activity. All this makes a book of a vital interest, of a practical approach both simple and more complex, according to the degree and form of neurotic development, and of an applicability to all branches of child study and training which the older limited conceptions could not create.

The book is frankly an exponent of psychoanalytic treatment and an illustration of the efficacy of psychoanalysis in discovering the causes of the neuroses in childish maladjustment to the surrounding world. It reveals the hindered and thwarted development of the libido which finds its satisfaction within itself rather than in healthy growth toward the outside world. It shows how the neurosis is cured and the child brought back to a healthy efficient attitude through discovering to him these things and helping him to a readjustment from the very source of his character and through his vital energy or libido. The author's discussion is based upon her wide experience with many forms of child neurosis and with adult neuroses which have the same mechanism and the same rooting in a badly adjusted childhood. The book is illustrated with reports from her own experience.

It is a book that deserves the attention of the neurologist since it does disclose in clear, concise and yet comprehensive way the psychology of the child nature in the sick or well, and that means of the adult too, the elements of this psychic nature, the mechanisms by which the

wrong attitudes toward life are constructed and by which the libido is diverted from its healthy goals. There are then given statement and description of the various forms in which the disturbance manifests itself such as the preoccupation with phantasy, antagonistic reaction to parents or others with whom the child comes into contact and the various forms of bad adjustment which seriously disturb the child's social relationships and cause an unconscious retreat into various definite forms of illness. Throughout the discussion emphasis is laid upon the place of all this in the development of any child. The nervous development is viewed in its relationship to the ordinary growth and development of the child. This serves to point out the need for intelligent and watchful care of the child from the start since the neurosis only grows from the same basis from which the healthy reactions develop and it also reveals how the neurosis once formed can also be traced back through the steps of its formation to the original source of the wrongly made adjustments, giving thus the possibility as well as the pathway and mechanism of attaining the readjustment. The book is therefore a broad study in child psychology revealing the need of a psychological understanding of the growing child, that of a profound analytical psychology, in its disclosure of these tendencies, these mechanisms which belong to the child's psychic nature and the disturbances which may result in his development.

The directness and simplicity of the presentation, together with its clear arrangement of topics make it a very suitable book for the guidance of parents and teachers in understanding the child and assisting it in its growth. It is a book which ought to awaken its readers, neurologists or untrained parents to a more vital realization both of the child's important place in the preparation of a better mental health for the future and to a recognition of the importance of the child's problems as part of the large matter of future health, happiness and success.

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